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FROM THE
President of the State Agricultural College,
LANSING, MICHIGAN.

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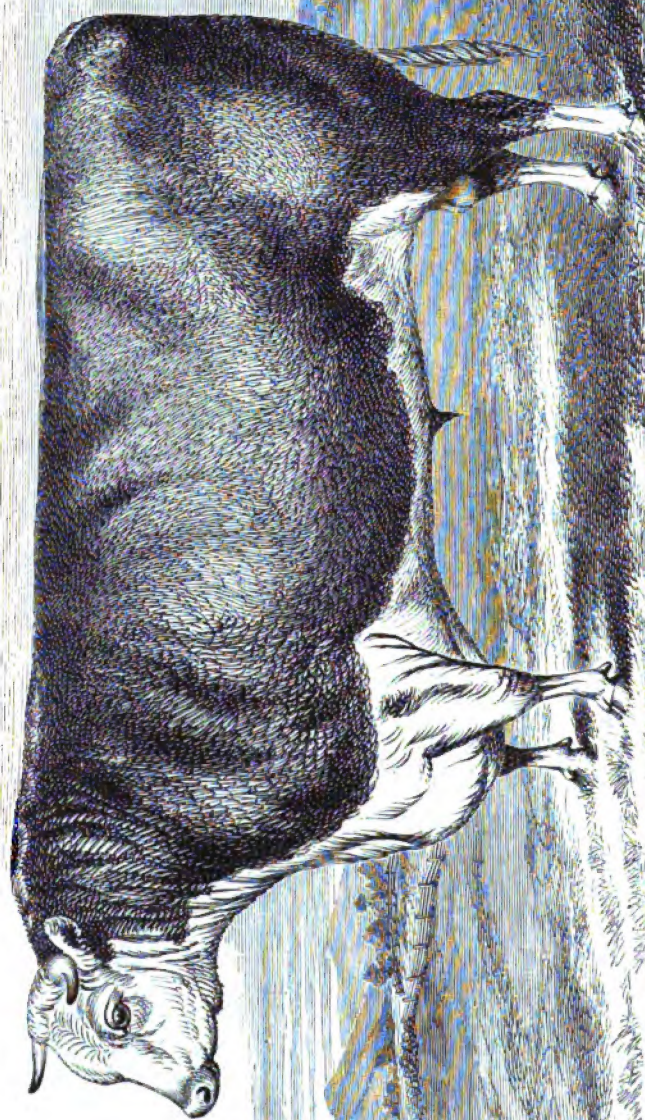
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SEVENTH ANNUAL REPORT
OF THE
S E C R E T A R Y
OF THE
STATE BOARD OF AGRICULTURE
OF THE
STATE OF MICHIGAN,
FOR THE YEAR 1868.



~~~~~  
**BY AUTHORITY.**  
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PRESIDENT OF THE AGRICULTURAL COLLEGE.

SANFORD HOWARD, SECRETARY.

JOSEPH MILLS, of Lansing, TREASURER.

R E P O R T
OF THE
SECRETARY OF THE STATE BOARD OF AGRICULTURE.

LANSING, December 31, 1868.

To the Legislature of the State of Michigan:

In compliance with legal requisitions, the accompanying
Report for the year 1868, with supplementary papers, is
respectfully submitted.

SANFORD HOWARD,
Secretary of the Michigan State Board of Agriculture.

STATE AGRICULTURAL COLLEGE.

THE number of applications for admission to the College in 1866 and 1867, having been largely in excess of the number that could be accommodated with rooms,—notwithstanding that in most instances four, and sometimes five, students were placed in a room,—the President, with the advice of the State Board of Agriculture, decided to discontinue the preparatory class for 1868, and gave notice to that effect through the public papers, before the opening of the term. Experience having shown the injudiciousness of crowding the rooms with students to the degree which had previously been done, it was resolved to change the course in this respect.

The number of students in attendance during the present year has been 82—quite as large a number as could be properly accommodated, especially as a room which had previously been occupied by four students, was necessarily taken as a class-room in Agriculture and Zoölogy. It may be remarked, too, that there were comparatively few changes of students at the beginning of the second half-term, the intention being so general, of those in attendance during the first, to continue during the second half-year, that no advertisement or notice was published of the time of the opening of the second half-term. The belief that the College would receive a much larger number of students than can at present be accommodated, if suitable additions were made to the dormitories, is fully warranted by the experience of the past few years.

Of the students in attendance during the present year, 10 were Seniors,—all of whom graduated at the late commence-

ment,—13 Juniors, 25 Sophomores, and 34 Freshmen. Seventy-six were from twenty-six counties of this State, and six from without the State. Sixty, or three-fourths of the whole number, are sons of farmers, and the larger part of them work or teach in winter, to earn means for defraying their college expenses. The average age of the Senior class is 21 6-10 years; that of the Junior and Sophomore classes, 20 4-10; and that of the Freshmen, 18 8-10 years.

The conduct of the students has been altogether praiseworthy. They have manifested great interest in their studies, and in their work, performing all their duties quietly and cheerfully. They have at all times had free access to the garden, where through the season there have been various ripened fruits, and no instance is known of anything having been wrongfully appropriated.

The corps of teachers at the College for the year ending Dec. 1, 1868, has consisted of a President, four Professors, and one Instructor.

By the organic law of the College, the students are required to labor on the farm, garden, or at mechanical work, a certain portion of each day. The system has proved itself to be a good one, and gives better and better satisfaction to both officers and students, from year to year. The exercise is conducive to physical health and mental vigor, whilst, in connection with the instruction which accompanies the labor, the student obtains much valuable information of a practical character, which could be obtained in no other way.

Joseph Harris, late editor and proprietor of the "Genesee Farmer," and the writer of the popular articles entitled "Walks and Talks," first published in the paper mentioned, and now continued in the "American Agriculturist," visited the College in June last, and in giving an account, in the journal last mentioned, of what he saw, said: "During the morning the students attend to their various studies. President Abbot took me into the rooms where they were reciting, and a finer set of young men I never saw together. Most of them are farmers'

sons. In the afternoon they put on a working suit, and for three hours were employed on the farm, or in the garden or tool-house. Some were cultivating corn; others pulling out stumps with a machine; others were helping the sheep-shearers, tying up the fleeces, weighing those of the different breeds and grades, and entering the weights in a book, with appropriate remarks in regard to the length of the staple, fineness, &c. One was pushing a hand-cultivator through the cleanest and best crop of onions I ever saw growing; another was cultivating a young apple orchard; others were in the hay-field, where a new mower and hay-tedder were about being started. * *

You need not tell me that a young man will not learn much at such an institution. Leaving science entirely out of the question, what he sees of good cultivation, good implements and machines, improved breeds of cattle, sheep and pigs, will go far towards making him a good farmer. Success to the American Agricultural Colleges, and may the day soon come—and it is coming very fast—when trained minds and skilled hands shall banish drudgery from American farms. I am no advocate for ease and indolence; I believe in work, but I want work to tell."

THE CROPS OF THE FARM

Have done as well this year as could have been expected, considering the character of the season. The spring was very cold and backward, which prevented the planting of Indian corn to be finished till June. The severe drought of July and August injured all late crops, and putting almost an entire stop to the growth of grass, pinched the grazing stock for food. Still, the report of the Farm Superintendent shows that the yield of some crops has been good. Indian corn gave an average of 93 bushels of ears per acre, and a portion of one field gave 120 bushels of ears per acre. The ground devoted to wheat was a piece from which the stumps had just been pulled, and there were many vacant spots where the soil had been disturbed by the large roots drawn out. The yield was 20 bushels

per acre, of the Treadwell variety, of good quality. Oats yielded 50 bushels per acre.

Considerable attention has, for several years, been given to the cultivation of roots,—chiefly Swedish turnips and mangold wurtzel. The crop of the present year was much injured by drought, though the yield of some portions of the field was good, and the average on 12 acres was 400 bushels per acre. When taken up, the latter part of October, the tops afforded a very timely supply of green food for cattle for several weeks. The mode of preparing roots for feeding to stock lately adopted — pulping and mixing them with cut fodder — so far as can be judged by practice thus far, seems likely to be attended with great advantage. Substances which could only be fed to stock with much waste, in the ordinary mode of feeding, are by this system wholly consumed, and the stock does well.

IN IMPROVED LABOR-SAVING IMPLEMENTS AND MACHINES,

Valuable additions have been made during the year. Phifer's Field-Cultivator and Gang-Plough, manufactured by A. L. Brearley & Co., Trenton, N. J., was received too late in the season of 1867 to be used that year. It has been used extensively this year, in preparing ground for corn-planting, in the cultivation of corn, in the preparation of ground for roots, and in the cultivation of the crop. For all these, and for other purposes, it has proved to be a very valuable implement. It received the gold medal of the New York State Agricultural Society at the trial at Utica, where competition was unrestricted, in 1867.

Crawford's Garden Cultivator, manufactured by Blymer, Norton & Co., Cincinnati, O., has been used with much saving of hand labor in the cultivation of garden crops.

Harrington's Hand Seed-Sower has been in use on the farm and in the garden for several years. It is a very useful machine, doing its work with precision and dispatch, and is also readily convertible into a hand cultivator, in which capacity it does good and speedy execution in the eradication of weeds.

The "New Yorker" reaping machine, manufactured by Seymour, Morgan & Allen, Brockport, N. Y., which received the gold medal of the New York State Agricultural Society, at the Anburn trial, 1866—competition unrestricted—was used during the last grain harvest with success. It is a self-raking machine, and does its work in an excellent manner, under any conditions that it would be proper to use a reaping machine.

The Buckeye combined mowing and reaping machine, manufactured by Aultman, Miller & Co., Akron, Ohio, by its performance both in grain and grass, supported the wide-spread popularity of this machine. As a reaper, it was used with an attachment called a "dropper." As a mower, it gave entire satisfaction.

The "Iron Mower," manufactured by Gregg, Plyer & Co., Trumansburg, N. Y., is a light, easy-working, and efficient machine.

The American Hay-Tedder, manufactured by the Ames Plough Company, Boston, is quite different in construction from the older form invented by Bullard. It is strong and simple, and very effective in its operation—leaves the hay light and exposed to the air. Bullard's tedder, perhaps, requires less power, but is hardly as strong. In making hay, cut sufficiently early to give that of the best quality, these machines usually save a day in the curing.

The root-pulper, an English machine, manufactured by Ransome & Sims, Ipswich and London, is one of the first, if not the first, ever introduced into the United States. The process of pulping roots has, in Great Britain, nearly superseded steaming and other cooking of them, except for milch cows in rather cold weather. The process is much less expensive than cooking, and for most feeding purposes is decidedly preferable. The pulp may be fed by itself, or mixed with any kind of chaffed or cut fodder, imparting to it an agreeable flavor, and probably aiding the digestion of the fibrous matter.

An English grubber and subsoiler has been obtained, but too late to be used this year. It is wholly of iron and steel, and is

of the most approved pattern. Old-country farmers consider it a very useful implement. We shall be able to speak more fully on this point after having used it.

Of the various horse-pitchforks that have been tried on the farm, the preference, as a hay-fork, is given to the Improved Harpoon, or Finger Fork, presented to the College by J. Covode, Cross Roads, Pa., as combining the requisites of simplicity, lightness, facility of management, and efficiency.

Beckwith's Roller Drill, manufactured by P. D. Beckwith, Dowagiac, Mich., has been in use on the farm three years, and its merits as a simple, strong, and efficient machine have been fully proved.

Of various inventions called "bag-holders," the Farm Superintendent thinks that of S. S. Rockwell, of Lansing, Mich., possesses many points of superiority, combining in its simplicity, facility of adjustment, and durability, all the desirable qualities of such an article.

THE LIVE STOCK OF THE FARM

Comprises specimens of the same breeds of cattle, sheep, and swine that have been mentioned in former reports, with the addition of the Berkshire to the stock of swine. Some other breeds of cattle, especially the Hereford, several breeds of sheep, and at least one other breed of swine—the Yorkshire—should be obtained as soon as funds can be spared for that purpose.

IN PERMANENT IMPROVEMENTS,

Progress has continued to be made. The expenditures which the College has made in draining the tract known as the "Big Marsh," have already resulted in greatly improving it. From the funds obtained from the sale of some lots, the College has been enabled to supply the long-felt want of a green-house and to partly stock it with plants; to erect a barn for the Horticultural Department; to make various alterations in the cattle and horse barns, by which they are rendered much more con-

venient for their several uses; to make repairs on the Boarding Hall and other buildings; to build a new road through a portion of the farm, make new lines of fence along the road, and much other new fence, inclosing land cleared and in the process of being cleared, to be used for pasture. The Parrish stump-puller has also been doing service in following up the removal of stumps, which for the past year or two has added much to the appearance of the fields, as well as aiding to bring them into a state in which thorough tillage is practicable.

EXPERIMENTS.

The most important experiments heretofore made have this year been repeated and carried further, and various others commenced. Prof. Miles has experimented in reference to the following points: With Indian corn, first, to ascertain the relative advantages of hills and drills; second, to ascertain the variation in the natural productiveness of soil, without manure. With roots, the effects of various fertilizers, as superphosphates and other prepared manures, salt, &c. With sheep, continuation of experiments reported on last year. With swine, repetition and continuation of experiments reported on in 1866. Arrangements are now made to commence experiments to show the relative value of different breeds.

To carry on the experiments with swine, it became necessary to erect a building for the purpose, with proper conveniences for weighing all the animals at regular intervals, without subjecting them to fright or waste of tissue by extraordinary exertion.

Prof. Kedzie has conducted experiments in reference to the value of muck, variously combined with unleached and leached wood ashes, with lime, and with salt. To show the relative effects of gypsum mixed with ashes, and also the effects of those substances applied separately. In reference to the volatile constituents of animal excrements, to show under what circumstances ammonia may be saved or lost, as manure. Also,

experiments in reference to the temperature of soils, as affected by their chemical and physical constitution.

In the Horticultural Department, experiments, under the supervision of Prof. Prentiss, were made to test the earliness, productiveness, and other qualities of thirty-six varieties of tomatoes, and similar trials with fifty-eight varieties of potatoes. Specimens of most of the varieties of tomatoes and potatoes were shown at the exhibition of the Michigan State Agricultural Society at Detroit, and also at the exhibition of the Central Michigan Society at Lansing, where they attracted much attention.

Detailed reports in regard to all these experiments are herewith appended. It cannot be doubted that they comprise very important matter, which deserves the attention of all who are interested in questions on which the successful practice of agriculture depends. Mr. Harris, in the article from which an extract has been given, spoke highly of the experiments in feeding sheep, and a summary of the results which he gave in that article was copied into nearly every agricultural paper, as well as into various other papers, in the country.

The Superintendent of the farm, in his annual report, remarks that "in its management, its use as a means of instruction has been kept prominently in view. Although the strictest economy has been practiced in all operations, the direct pecuniary profit to be derived from the system pursued, has been a matter of secondary consideration. In supplementing instruction in the class-room by practical illustrations in the field, that serve to fix in the mind of the student the principles he has been taught, while he gains a knowledge of their applications, it cannot be reasonably expected that the expenditure of a given amount of labor will command the same pecuniary return that should be derived from it under more favorable circumstances. The labor expended in conducting experiments cannot, from its very nature, be remunerative; while in the field, the cost of the crops raised in the immediate vicinity of experimental plots is increased from the unavoidable interference with the regular

distribution of labor. Again, where a number of distinct breeds of domestic animals are kept as they are here, for the purposes of illustration and experiment, it is impossible to derive from them the same direct profit that could be gained by limiting the selection to a single breed, especially adapted to the peculiarities of the farm and the system of management. The leading object of the farm being thus incompatible with the idea of direct pecuniary results, they should not be regarded as the exclusive standard by which the success of its management is to be measured."

SUMMARY OF CASH ACCOUNT

Of the Superintendent of Farm Department, for the year ending December 1, 1868.

RECEIPTS.

Warrants,	\$3,623 79
Sales of farm produce,	1,089 00
" swamp lands,	50 00
	<hr/> \$4,762 79

EXPENDITURES.

Paid to Secretary, farm receipts,	\$1,089 00
" " " swamp land receipts,	50 00
" for ditching on big marsh,	495 50
" on account of implements,	376 63
" for work,	866 01
" " feed,	791 47
" " lumber,	284 39
" " harness repairs, &c.,	37 60
" on account of stock,	86 45.
" expenses to Fairs, with cattle,	73 57
" " " Cattle Convention, at Springfield, ..	24 45
" for seeds,	77 45
" " threshing,	51 51
" on account of fences,	174 87
" " " wells,	54 20
" " " farm buildings,	15 08
" " " College Hall,	14 04
" " " experiments,	95 70
" " " swamp lands,	9 50
" for hardware (nails, bolts, &c.),	33 22
" " 1 ton of plaster,	9 00
" blacksmith bills,	13 50
" toll,	1 20
" on account of farm office,	38 45
	<hr/>
	\$4,762 79 \$4,762 79

STATEMENT OF RECEIPTS AND EXPENDITURES

Of the Farm Department, for the year ending December 1, 1868.

RECEIPTS.

Warrants,	\$3,623 79	
Cash sales of farm produce,	1,089 00	
" " swamp lands,	50 00	
Labor of students, paid by College,	1,002 07	
" " (during recess), paid by College,	181 51	
Board of men at farm house, paid by College,	540 75	
Stock purchased,	100 00	
Bill of boarding hall,	79 49	
Freight on feed,	12 30	
Implements,	80 00	
Bill of Lansing & Son,	40 89	
" Grove & Whitney,	115 11	
" harness repairs,	7 80	
Blank books for office,	8 00	
Duty on grubber, (imported,)	9 70	
Labor of men now due,	361 36	
Produce of last year on hand, Dec. 1, 1867,	2,492 97	
Account of last year with crops of 1868,	302 47	
Wool of 1866 on hand, Dec. 1, 1867,	290 50	
Labor on wood,	214 86	
		<hr/> \$10,602 57

EXPENDITURES.

College Treasury.

Farm receipts,	\$1,089 00	
Swamp land receipts,	50 00	
		<hr/> \$1,139 00

Swamp Lands.

Ditching on "big marsh,"	\$495 50	
Surveying and expense account,	21 00	
		<hr/> 516 50

College.

Labor of students,	\$19 28	
" men and teams,	27 40	
Expenses at Fairs,	116 78	
Experiments,	355 53	
Work on College Hall,	14 04	
		<hr/> 533 03

Boarding Hall.

Wood,	\$410 25	
Labor of students,	13 45	
" men and teams,	149 32	
Board of horse,	184 00	
	<hr/>	\$757 02

Farm House.

Wood,	\$59 37	
Labor of students,	9 03	
" men and teams,	60 70	
	<hr/>	129 10

Horticultural Department.

Balance of ledger account,	\$93 90	
	<hr/>	93 90

Stock.

Items from cash account,	\$86 45	
" College account,	100 00	
	<hr/>	186 45

Implements.

Farm implements,	\$392 34	
Tools on shop account,	9 99	
Implements on wood, and per im- plement account,	89 94	
Care of implements,	67 43	
	<hr/>	559 70

Miscellaneous.

Paid for work in 1867,	\$162 08	
" toll,	1 20	
" camp equipage,	5 80	
" threshing bills of 1867,	7 80	
Expenses of farm office,	65 45	
Labor on wood on hand,	50 00	
	<hr/>	292 28

Permanent Improvements.

Buildings,	\$206 37	
Fences and roads,	414 94	
Wells and drains,	125 32	
Stumping,	143 08	
Clearing,	110 61	
Removing stones from fields,	57 67	
Lumber,	284 39	
Hardware, (nails, hinges, &c.),	89 91	
	<hr/>	1,432 31

Current Farm Expenses.

Labor of men and teams,	\$992 72	
" students,	290 65	
Care of stock—men,	757 87	
" " students,	149 59	

Labor acc't of 1867 with crops of		
1868,	\$302 47	
Seeds purchased,	43 70	
Labor on manures, (composts,)..	40 81	
Plaster,	9 00	
Repairs of implements,	51 42	
Threshing, (cash acc't,).....	43 71	
Produce on hand, Dec. 1, 1867, ..	2,113 20	
	<hr/>	\$4,795 15
<i>Account of Crops of 1869.</i>		
Labor,	\$134 38	
Seed wheat,	33 75	
	<hr/>	168 13
		<hr/>
		<u>\$10,602 57</u> <u>\$10,602 57</u>

STATEMENT OF RECEIPTS AND EXPENDITURES

Of College Farm, for the year ending December 1, 1868.

RECEIPTS.

Cash sales of produce,.....	\$1,089 00
Produce sold to boarding hall,.....	676 02
“ “ “ farm house,.....	143 42
853 lbs. of wool on hand, @ 30c.,.....	255 00
53 61-100 tons of hay, @ \$10,.....	536 10
825 bu. of oats, @ 60c.,.....	495 00
316 “ “ wheat, @ \$1.60,.....	505 60
20 tons wheat straw, @ \$3,.....	60 00
174 “ oat “ @ \$5,.....	88 75
1,873 bu. corn, (ears,) @ 34c.,.....	636 82
46 tons of stalks, @ \$3,.....	138 00
3,908 bu. of roots, @ 13c.,.....	506 54
15 “ “ buckwheat,.....	15 00
Increase in value of stock, as per inventory,.....	864 00
	<hr/> \$6,009 25

EXPENDITURES.

Labor of men and teams, @ \$4 per day,...	\$992 72
“ students,.....	290 65
Care of stock—men,.....	757 87
“ “ students,.....	149 59
Seeds purchased,.....	43 70
Labor on manures, (composting,).....	40 81
Plaster,.....	9 00
Account of 1867, for labor and seed,.....	302 47
Repairs of implements,.....	51 42
Threshing bill, (cash account,).....	43 71
Produce on hand Dec. 1, 1867,.....	<u>2,113 21</u>
	\$4,795 15
Profit to balance,.....	1,214 10
	<hr/> \$6,009 25
	<hr/> <u>\$6,009 25</u>

HORTICULTURAL DEPARTMENT.

Prof. Prentiss, the Superintendent of this department, reports that with the exception of injury from drought, in some cases, the season was favorable to most garden products.

The apple orchard bore but little fruit this year, owing to causes which operated to lessen this crop over a large portion of the State. The trees have been brought to good forms by judicious pruning, and the cultivation of the ground has made them very thrifty and large of their age. The pear orchard has done very well, especially the standard trees, some of which are very fine. A few of the trees have fruited, and in a year or two more we may expect returns of some value from the orchard.

From the fruit garden, a good crop of grapes and a bountiful crop of strawberries were obtained. Some dwarf apple trees are in fine condition, and fruited more in proportion to their age and size than standards.

The young evergreen trees have grown well, and will be ready for transplanting next spring. Several hundred seedling apple trees have been grown, which will be valuable for various practical illustration to classes in Horticulture.

Permanent improvements have been pushed forward in this department to a considerable extent. More of the rough and uneven ground between the highway and the College building, and on the south and west side of the building, has been broken up and thoroughly smoothed, and portions seeded to grass. The ground in the young groves has been smoothed, making them, as they were intended to be, ornaments to the place.

By alterations in the basement of the College building, the tool-room for the Horticultural Department has been enlarged and made more convenient, an office and seed-room provided, and a much needed fruit and store-room has been made, intended, when completed, to be frost-proof.

The cash expenditures in this department, to December 1, were as follows:

For tools, including straw-cutter, wagon-box, garden cultivator, &c.,.....	\$125 85
“ seeds, vegetable and flower, and for nursery and lawn,....	70 29
“ repairs in tool room and fruit room,.....	16 79
“ purchase of horse, and expenses attending the same,.....	206 80
“ blank book, postage, stationery, &c., for office,.....	7 20
“ blacksmithing,.....	37 03
“ hired labor, by the season, \$203 50; other labor, \$81 50,..	285 00
“ feed for team, including hay,.....	164 97
“ wood,.....	162 37
“ account of College, including carpenter work, furniture, two stoves, &c.,.....	57 92
“ manure,.....	18 43
“ running expenses of green-house,.....	43 67
“ new plants for green-house,.....	71 28
“ pots for same,.....	45 40
“ finishing green-house and barn, and painting both buildings and eave-troughs,.....	415 15
“ expenses of attending agricultural exhibitions,.....	36 15
“ new harness, and repairs of old ones,.....	52 68
Total cash expenditures,.....	<u>\$1,816 98</u>
Additional expenditures:	
Students' labor, 8,218½ hours,.....	\$527 29
Students' labor in summer vacation,.....	78 00
Hay bought of Harrison,.....	22 51
“ “ College Farm,.....	15 05
Board of hired men at College Farm house, 200 days,.....	100 00
Board of laborers at College building hall,.....	52 10
	<u>\$842 95</u>
Add cash expenditures,.....	1,816 98
	<u><u>\$2,659 93</u></u>

The above amount embraces all expenditures in this department, and includes expenses for wood, furniture, janitor work, &c., for College Hall, and all expenses for permanent improvements of grounds, buildings, &c.

VALUE OF PRODUCE.

The cash sales of produce have amounted to \$418 24. Of this amount, \$72 61 were received from sales of green-house plants, and the Superintendent has “no doubt that this branch

of the department, when once fully stocked, will more than pay all expenses attending its maintenance." It may be stated here, that two hundred and six varieties of vegetables, embracing twenty-three species, have been cultivated in the garden this year, giving the students an opportunity of learning their characteristics and peculiar qualities.

Cash sales,.....	\$ 418 24
Sold to the Boarding Hall,.....	479 16
" the Farm House,.....	43 60
" Pres't Abbot,.....	7 10
" Strong & Moores,.....	15 00
4,888 lbs. hay, first quality, @ 10 ¢ ton,.....	24 44
4,115 " " poor "	12 00
23 bush. buckwheat, extra quality, @ \$1 50,.....	34 50
	<hr/>
	\$1,034 04
Value of produce stored for the winter,.....	187 00
	<hr/>
	\$1,221 04
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The needs of the College, in regard to additional dormitories, have been already set forth. If we were to take the matter wholly on the ground of economy, or the amount of benefit which the Institution might confer in proportion to the expenses, the policy of affording accommodations to a larger number of students is obviously correct. The same faculty, the same farm and garden, laboratory, &c., may as well give instruction to three hundred students as to a smaller number. Estimates for such a building as is required are herewith submitted.

In regard to new farm buildings, there is much need of a piggery adapted to the keeping of several breeds of swine, in such a manner that results showing their relative profits may be obtained. The building (before alluded to) lately provided for experimenting with swine, is only of a temporary character, and can accommodate but a small part of the swine which it is necessary to keep on the farm.

The building which has heretofore been occupied as a horse-barn is by no means well adapted to the purpose. It might readily be converted into a tool-house and work-shop—which

is also wanted — if suitable accommodations for horses were provided elsewhere.

Estimates for a dormitory building are herewith submitted. Estimates are also submitted in reference to the current expenses of the College for the years 1869 and 1870.

DONATIONS TO THE COLLEGE FOR 1868.

From the AMES PLOUGH COMPANY, Boston, Mass.;

American Hay-Tedder.

From H. B. WILBAR, Syracuse, N. Y.;

Bullard's Hay-Tedder.

From AULTMAN, MILLER & Co., Akron, Ohio;

Senior Buckeye Reaper and Mower, with dropping attachment.

From H. P. WESTCOTT & Co., Seneca Falls, New York;

Westcott's Patent Butter-Pall.

From GEO. P. ALLEN, Woodbury, Conn.;

Allen's Patent Weeding Hoe—two sizes.

From R. P. HOSNER & Co., Lansing, Mich.;

Ball's Plough; Shovel Plough; Double-Shovel Cultivator; Hand-Weeding Cultivator; Horse Hay-Fork; Burdick's National Feed-Cutter through J. F. Bryan & Bros., Detroit, Mich.

From DART & DAVIS, Lansing, Mich.;

Ground Back Cross-cut Saw.

From J. R. ROBERTSON, Syracuse, N. Y.;

Excelsior Root-Cutter.

From BERRY & BROTHERS, Detroit, Mich.;

Sample of Berry's Superphosphate of Lime; sample of coarse ground bone; sample of fine ground bone.

From the N. W. FERTILIZER COMPANY, Chicago, Ill.;

Sample of Baugh's Superphosphate of Lime.

“ “ Blood Manure.

From M. S. BAKER & Co., Lansing, Mich.;

Brown's Grain Drill.

From A. A. JENNE, Lansing, Mich.;

Right to use Dorsett's mode of protecting hay and straw.

From PROF. M. MILES, Lansing, Mich.;

Samples of Prize Grains at the Provincial Exhibition at Hamilton, Ontario, 1868; also, samples of Grains at the Exhibition of the Mich. State Agl. Society, 1868.

From G. W. SMITH, Grand Rapids, Mich.;

Specimens of Gypsum, Geodes and Fossils.

From R. M. SLOCUM, Student;

Iron Pyrites and Crinoids.

- From MARK FLANNIGAN, Detroit, Mich. ;
Specimen of superior Cotton Batting.
- From Prof. J. C. HOLMES, Detroit, Mich. ;
Seeds of *Allanhus*, or Tree of Heaven.
- From CAPT. COLLINS, U. S. N., through Landreth & Co., Philadelphia, Pa. ;
Sixteen packages of foreign Seeds.
- From the DEPARTMENT OF AGRICULTURE, Washington, D. C. ;
Packages of various Field and Garden Seeds.
- From HON. Z. CHANDLER ;
Congressional Directory, Fortieth Congress ; Speech of Hon. W. H. Stewart on National School of Mines ; Patent Office Report, 1865, three volumes ; Report of Commissioner of Land Office, 1866 ; Report Dept. of Agriculture, 1866 ; Report on Commerce and Navigation, 1866 ; Report on Commercial Relations, 1866 ; Mineral Resources of the United States ; Impeachment Documents, three volumes.
- From THORNTON A. JENKINS, Chief U. S. Bureau of Navigation ;
Astronomical and Meteorological Observations at the United States Naval Observatory, 1865.
- From HON. AUSTIN BLAIR ;
Coast Survey, 1865 ; Commerce and Navigation, 1866.
- From HON. J. M. HOWARD ;
Patent Office Report, 1866, three vols. ; Report on International Coinage.
- From HON. JUSTUS GAGE, Dowagiac, Mich. ;
Niles's Register, vols. XXXV to LV, inclusive.
- From HON. A. S. WELCH ;
Mineral Resources of the United States.
- From HUGH C. THOMSON, Sec. Ontario Provincial Board of Agriculture, Toronto ;
First volume Canada Short-horn Herd Book.
- From the SMITHSONIAN INSTITUTE ;
Contributions to Knowledge, Vol. XV ; Smithsonian Report, 1867.
- From the COMMISSIONER OF EDUCATION ;
Report of Department of Education, 1867-8.
- From ORANGE JUDD & Co., New York ;
"How Plants Grow," by Prof. S. W. Johnson.
- From A. M. FITZHUGH, Bay City, Mich. ;
Specimen of Coal from the well of the Atlantic Salt Manufacturing Co.
- From R. F. BUSH, Bay City, Mich. ;
Barrel of specimens for Museum.
- From the STATE DEPARTMENT, Michigan ;
Debates of the Constitutional Convention, 1867, two volumes.

PERIODICALS.

FROM PUBLISHERS;

Western Rural.
Prairie Farmer.
Ohio Farmer.
Lansing Republican.
Ann Arbor Democrat.
Michigan Argus.
Bay City Journal.
Wolverine Citizen.
Traverse Bay Eagle.
Railroad Record.
The Standard.
Unitarian Journal.
American Missionary.
Book Buyer.
Communist.
Essex Institute Proceedings.
Magazine of Horticulture.

FROM MEMBERS OF THE FACULTY;

Detroit Post, tri-weekly.
" Advertiser and Tribune.
" Free Press.
The Independent.
The Advance.
The Congregationalist.
The Michigan Teacher.
Putnam's Monthly.

SANFORD HOWARD,

Secretary Michigan State Board of Agriculture.

SECRETARY'S ACCOUNT.

RECEIPTS FOR THE YEAR BEGINNING DEC. 1, 1867, AND ENDING DEC. 1, 1868.

1867.

Dec. 1. Cash on hand, \$ 846 56

1868.

Dec. 1.	Cash from State Treasurer,	20,000 00
	" Swamp Lands,	592 49
	" Farm receipts,	1,100 90
	" Garden "	246 10
	" College bills,	6,871 36
		\$29,657 41

The receipts were disposed of as follows:

1868.

Dec. 1.	Cash at sundry times to Joseph Mills, Treasurer,	\$29,553 95
	Cash refunded students,	103 46
		\$29,657 41

WARRANT ACCOUNT.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1867.			
872	Dec. 7	M. Miles,	Ditching on Big Marsh,	\$ 280 00
873	" 1	Geo. T. Fairchild, ...	Library,	100 00
874	" 21	S. S. Rockwell,	Boarding Hall current expenses,	150 00
875	" 24	P. C. Ayres,	Farm house, for building on a kitchen, ...	150 00
876	" 24	Geo. T. Fairchild, ...	Salary,	25 00
	1868.			
877	Jan. 3	A. F. Allen,	Farm department, freight on feed,	12 30
878	" 16	Geo. T. Fairchild, ...	Salary,	100 00
879	" 16	M. Miles,	Salary,	100 00
880	" 18	" "	Farm department, current expenses,	150 00
881	" 16	Sanford Howard,	Current expenses of office, see No. 839, ...	50 00
882	" 16	" "	Salary,	41 67
883	" 16	M. Miles,	Last year's current expenser,	\$ 18 90
			Ditching Big Marsh,	210 00
			Ditching Sec. 31, Bath,	27 00
			Farm department,	35 06
				290 96
884	" 16	S. O. Knapp,	New Boarding Hall committee,	100 00
885	" 17	A. N. Prentiss,	Green-house and barn,	500 00
			NOTE.—Green-house has cost, ...	\$1,662 10
			Barn for Horticultural dept., ...	573 91
			Tool-house and wagon shop for Horticultural dept.,	83 40
			Plants and expenses of,	218 83
			Pots and freight,	112 86
			Hydropult, hydrometer, &c., ...	31 85
			Well and pump at barn,	22 40
			Expenses, except about \$20 for hardware, all covered by warrants heretofore drawn.	
886	" 21	A. F. Allen,	Salary,	40 00
887	" 22	M. Miles,	Ditching at Mud Lake,	\$ 13 00
			Ditching in Bath,	15 53
			Library, express on herd book, .	50

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1898.			
887	Jan. 22	M. Miles,	Farm department,.....\$214 71	
			Farm department,..... 50	\$ 244 21
888	" 22	M. Miles,	Salary,.....	100 00
889	" 27	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	150 00
890	" 30	R. C. Kedzie,	Chemical Laboratory,.....	50 00
891	Feb. 8	A. F. Allen,.....	Farm house, cistern,..... \$7 81	
			Furniture,..... 7 25	
			Current expenses,..... 48 97	
			NOTE.—Account settles for a balance of previous warrant,.....	52 75
892	" 8	R. C. Kedzie,.....	Salary,	250 00
893	" 4	Geo. T. Fairchild, ...	Text books,.....	100 00
894	" 5	Sanford Howard,....	Salary,.....	41 67
895	" 7	A. F. Allen,.....	Salary,	35 00
896	" 10	S. S. Rockwell,	Boarding Hall, a new stove,.....	110 00
897	" 14	" "	Boarding Hall, current expenses,.\$153 34	
			Furniture,..... 9 50	
			Expenses,..... 1 75	174 59
898	" 15	A. N. Prentiss,.....	Horse for Horticultural Department,.....	200 00
899	" 21	M. Miles,	Automatic Gate,	\$65 00
			Fencing along plank road,	40 00
			Well at cattle barn,.....	12 00
			Iron mower,.....	80 00
			Current expenses,.....	52 50
				249 50
	" 24	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	300 00
901	" 25	Geo. T. Fairchild, ...	Salary,	100 00
902	"	R. C. Kedzie,	Chemical laboratory,.....	53 77
903	" 28	Geo. T. Fairchild, ...	Books,.....	300 00
904	" 9	T. C. Abbott,	Salary,	804 86
905	March 5		Advertising College opening, Tri- bune..... \$10 00	
			Free Press,.....	11 25
			Post,.....	18 00
				39 25
906	" 6	M. Miles,	Salary,	175 00
907	" 6	R. C. Kedzie,.....	Salary,	125 00

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1868.			
908	March 6	A. N. Prentiss,.....	Salary,	\$ 375 00
909	" 6	G. T. Fairchild,	Salary,	150 00
910	" 6	A. J. Cook,.....	Salary,	256 00
911	" 6	Sanford Howard,....	Salary,	41 67
912	" 6	S. S. Rockwell,.....	Salary,.....	137 50
913	" 6	A. F. Allen,.....	Salary,	25 00
914	" 11	" "	Salary,	17 00
915	" 17	Will W. Tracy,.....	Salary,.....	92 48
916	" 17	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	745 95
917	" 20	A. J. Cook,.....	Salary,.....	80 00
918	" 23	Sanford Howard,....	Salary,.....	41 67
919	" 27	A. F. Allen,.....	Farm House, wall paper,..... \$ 20	
			Current expenses,..... 49 80	50 00
920	" 27	" "	Farm House, current expenses,.....	181 30
921	April 7	S. S. Rockwell,.....	Boarding Hall, furniture,..... \$45 53	
			Current expenses,..... 37 54	84 07
922	" 7	S. S. Rockwell,.....	Boarding Hall, bedsteads,..... 60 00	
			Repairs, 40 84	
			Current expenses,..... 328 57	429 41
923	" 8	M. Miles,	Salary,	150 00
924	" 13	T. C. Abbott,.....	Board meeting,..... \$10 00	
			Postage, blank books, envel- opes, &c.,..... 14 63	
			Clock, 5 00	
			Museum, express,..... 36	29 95
925	" 13	A. N. Prentiss,.....	Green-house and barn,..... 26 70	
			Wood for do,..... 21 87	
			Implements,..... 36 00	
			College Hall,..... 10 75	
			Harness-maker's bill,..... 20 65	
			Seeds and Plants,..... 30 70	
			Horticultural department,..... 174 96	311 63
926	" 13	A. N. Prentiss,.....	Horticultural department, tools and hardware,..... 64 93	
			Pair bobs, 52 00	

REPORT OF THE SECRETARY OF THE

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1868.			
926	April 13	A. N. Prentiss,.....	Blind drain,.....	\$61 28
			Museum,.....	50
			Current expenses,.....	68 60
				\$226 31
927	" 13	M. Miles,.....	Farm department, implements,...	24 90
			Experiments, lumber,.....	9 52
			Library, herd books,.....	12 00
			Swamp lands, (expenses,).....	4 75
			College, plastering, &c.,.....	8 35
			Current expenses,.....	333 36
				302 68
928	" 14	A. F. Allen,.....	Farm house, current expenses,.....	9 34
929	" 15	A. F. Allen,.....	Farm house, furniture,.....	131 78
930	" 15	A. F. Allen,.....	Salary,	\$49 65
			Farm house, current expenses,...	10 00
				59 65
931	" 15	A. F. Allen,.....	Farm house, current expenses,.....	45 72
932	" 15	A. F. Allen,.....	Farm house, current expenses,.....	81 57
933	" 24	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	175 00
934	" 25	T. C. Abbot,	Advertising, Western Rural,.....	\$16 20
			Post,.....	9 00
				25 20
935	" 28	R. C. Kedzie,	Salary,	100 00
936	May 4	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	150 00
937	" 7	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	770 17
938	" 8	M. Miles,	Farm departm't, tools, bags, &c.,..	\$ 61 60
			Current expenses,.....	261 60
			Library, express,.....	50
			College, class room,.....	5 04
				338 74
939	" 11	Sanford Howard,....	Traveling expenses,.....	\$40 50
			Expenses of office,	48 67
				23 90
			NOTE.—This account covers warrant 881 and balance of warrant 883.	
940	" 11	Sanford Howard,....	Salary,	41 67
941	" 13	A. N. Prentiss,.....	Horticultural department, seeds,...	\$33 69
			Cultivator,.....	12 75
			Box on lumber wagon,	20 00
			Other tools,.....	5 20

WARRANT ACCOUNT.—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1898.			
941	May 13	A. N. Prentiss,.....	Horticultural dept., painting barn, \$ 53 00 Other building expenses,..... 63 08 Current expenses,..... 40 68 College Hall, for wood, chairs, &c.,..... 171 02	\$399 32
942	" 14	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	63 65
943	" 14	G. T. Fairchild,.....	Salary,.....	375 00
944	" 14	M. Miles,.....	Salary,.....	225 00
945	" 14	R. C. Kedzie,.....	Salary,.....	275 00
946	" 14	T. C. Abbot,.....	Salary,.....	230 14
947	" 14	R. C. Kedzie,.....	Chemical apparatus,.....	81 64
948	" 23	Wm. R. Kedzie,	Salary,.....	83 33
949	" 30	S. S. Rockwell,.....	Boarding Hall, furniture, &c.,.....\$79 12 Current Expenses,..... 6 33	85 45
950	June 1	Sanford Howard,....	Salary,.....	41 66
951	" 1	A. N. Prentiss,.....	Salary,.....	375 00
952	" 1	S. S. Rockwell,.....	Salary,.....	137 50
953	" 1	C. C. Stowe,.....	Salary,.....	50 00
954	" 1	Will W. Tracy,.....	Salary,.....	125 00
955	" 1	A. J. Cook,.....	Salary,.....	170 00
956	" 1	Sanford Howard,....	Expenses of office,.....	50 00
957	" 1	A. J. Cook,.....	Salary,.....	100 00
958	" 1	" "	Museum,....	10 66
959	" 2	S. R. Greene,.....	Boxes for reports,.....	24 00
960	" 2	A. N. Prentiss,.....	Horticultural department, green- house,.....\$79 22 Strawcutter,..... 22 00 Implements,..... 3 75 Current expenses,..... 69 76	174 73
961	" 2	E. B. Millar,.....	Farm-house, current expenses,.....	24 12
962	" 2	T. C. Abbot,.....	Board expenses, A. C. Prutzman,.. 29 08 Justus Gage,..... 40 00 O. Hosford,..... 20 00 H. G. Wells..... 19 00 D. Carpenter,..... 29 25	137 33

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1868			
963	June 3	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	\$558 00
964	" 3	C. C. Stowe,.....	Farm House, current expenses,.....	75 00
965	" 3	G. W. Harrison,	Salary,	120 00
966	" 9	M. Miles,.....	Farm department, implements,.. \$ 3 75	
			Fencing,... .. 61 28	
			Other expenses,..... 154 66	
			Salaries, Harrison,..... 2 90	222 50
967	" 10	Sanford Howard,....	Farm department, reaper,.....	80 00
968	" 18	Robert Burcham,....	Stumping ground for experiments, in charge of Prof. of Chem- istry,.....\$ 23 13	
			Labor on experiments..... 45 00	68 13
969	" 20	R. C. Kedzie,.....	Chemical laboratory, chemicals,.. \$77 97	
			Cans and bottles containing ch'a, 12 07	
			Apparatus,..... 55 20	
			Railroad bills,..... 11 42	
			Other expenses,..... 5 29	161 95
970	" 26	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	180 00
971	" 27	Lansing & Son,.....	Farm department, blacksmithing,.....	40 89
972	" 30	Will W. Tracy,.....	Salary,.....	75 00
973	" 30	Sanford Howard,....	Farm department, Ayrshire bull,.....	100 00
974	July 1	T. C. Abbot,.....	Salary,	187 50
975	" 1	" "	Salary,.....	100 00
976	" 2	Geo. T. Fairchild,....	Library and text book account,.....	100 00
977	" 2	" "	Salary,.....	100 00
978	" 3	B. G. Johnson,.....	New roofing the Boarding Hall,	315 64
979	" 3	Sanford Howard,....	Salary,	41 67
980	" 7	T. C. Abbot,....	Salary,	87 50
981	" 10	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	146 77
982	" 10	" "	Boarding Hall, current expenses,.....	88 44
983	" 11	T. C. Abbot,	Repair of diploma plate,..... \$3 50	
			Repair of mail bag,..... 50	
			Exchange on drafts to Dr. Thur- ber, Detroit Post and Western Rural,..... 30	
			Office furniture,..... 3 50	7 50

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1938.			
984	July 16	Grove & Whitney,...	Hardware and tinman's labor, College Hall,.....	\$8 50
			Farm house,.....	16 25
			Farm department, implements,.	9 80
			Farm, other expenditures,.....	132 52
				\$166 07
985	" 16	Cannell & Edmonds..	Farm department, repair of harness,.....	7 80
986	" 23	S. R. Greene,.....	Making boxes for reports,.....	\$ 39 20
			Repair window in office, (Lansing,) ..	39
				39 50
987	" 25	S. S. Rockwell,.....	Boarding Hall, current expenses,.	105 07
			Lumber for roof,.....	1 50
				106 57
988	" 25	" "	Boarding Hall, current expenses,.....	190 28
989	" 27	M. Miles,	Salary,.....	250 00
990	Aug. 4	A. J. Cook,.....	Museum, lumber, wire, &c.,.....	4 45
991	" 8	T. C. Abbot,	Salary,.....	100 00
992	" 8	Jno. A. Kerr & Co.,..	See next number, account covers No's. 992 and 993.....	79 50
993	" 8	" "	For Secretary's blanks, printing, ..	\$2 00
			Secretary's office in College, circulars,.....	\$12 00
			Work bills,.....	12 00
				24 00
			Library binding,	72 50
			Farm department, blank books, ..	8 00
			Hort. department, advertising, ..	3 03
				30 00
994	" 12	A. N. Prentiss,.....	Salary,	375 00
995	" 13	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	350 00
996	" 13	C. C. Stowe,.....	Farm house, current expenses,.....	250 00
997	" 17	Sanford Howard,....	Salary,.....	41 67
998	" 19		Salary,	41 66
999	" 24	T. C. Abbot,.....	Salary,	87 50
1,000	" 25	M. Miles,.....	Farm department, implements,..	\$59 55
			Pump for pasture,.....	12 60
			Other expenditures,.....	541 67
				613 72
1,001	" 25	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	64 61
1,002	" 28	T. C. Abbot,.....	Expenses of State Board of Agriculture:	
			H. G. Wells,	\$10 10

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1868.			
1,002	Aug. 28	T. C. Abbot,.....	Expenses of State Board of Agriculture:	
			D. Carpenter,.....	\$9 10
			J. Gage,.....	11 55
			Mr. Knapp,.....	20 40
			Mr. Hosford,.....	10 00
			Mr. Prutzman,.....	11 65
				\$ 72 80
1,003	" 31	M. Miles,	Salary,.....	125 00
1,004	" 31	R. C. Kedzie,.....	Salary,.....	350 00
1,005	" 31	Geo. T. Fairchild, ...	Salary,.....	275 00
1,006	" 31	A. J. Cook,.....	Salary,.....	150 00
1,007	" 31	S. S. Rockwell,.....	Salary,.....	137 50
1,008	" 31	C. C. Stowe,	Salary,.....	100 00
1,009	" 31	W. R. Kedzie,.....	Salary,.....	83 33
1,010	" 31	Will W. Tracy,.....	Salary,.....	100 00
1,011	" 31	Edwin H. Hume,....	Salary,.....	90 00
1,012	" 31	R. C. Kedzie,.....	Salary,.....	25 00
1,013	" 31	Advertiser & Tribune	Advertising in March, 1868,.....	12 00
1,014	Sept. 2	T. C. Abbot,	Salary,.....	231 25
1,015	" 9	S. S. Rockwell,.....	Boarding Hall, current expenses,	300 00
1,016	" 10	M. Miles,	Farm dept., implements, pulper, &c.,.....	\$91 90
			Other expenditures,	87 37
				179 27
1,017	" 10	" "	Salary,.....	150 00
1,018	" 10	Home Ins. Co., N. Y.,	Insurance on barns and contents,.....	27 30
1,019	" 10	T. C. Abbot.	Payment of College bills:	
			Farm house, current expenses, ..	\$1 38
			Library.....	1 50
			Board expenses,	1 50
			Stationery and stamps,.....	8 26
			Hinges and door bell,.....	4 45
			College Hall, repairs, glass,	50
				17 59
1,020	" 12	A. N. Prentiss,.....	Horticultural dept., see No. 1,023,	50 00
1,021	" 12	D. L. Case, Executor,	Rent of office for Sec. of Board of Agricul- ture, in Lansing,.....	150 00
1,022	" 31	A. N. Prentiss,.....	Horticultural dept., see No. 1023,.....	100 00

WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1883.			
1,023	Sept. 21	A. N. Prentiss,	Horticultural dept., see No. 1,026,	\$ 50 00
1,024	" 21	T. C. Abbot,	Expenses as member of Board of Agri.,...	17 10
1,025	" 26	" "	Salary,	231 25
1,026	" 29	A. N. Prentiss,	Horticultural department,	61 07
			Account covers—	
			Warrant 787,	\$100 00
			Warrant 1,020,	50 00
			Warrant 1,022,	100 00
			Warrant 1,023,	50 00
			Warrant 1,026,	61 07 \$361 07
			Sales—	
			Garden produce,	86 73
			Green house plants,	62 26
			Keeping colt,	12 80 161 79
				\$522 86
			Expenditures—	
			Implements,	\$ 43 20
			College Hall,	20 58
			Seed and plants,	30 13
			Green-house, construct'n and painting,	138 04
			Green-house, furniture, ..	30 55
			State Fair exhibition, ..	36 15
			Current expenses,	224 21 \$522 86
1,027	Oct. 1	A. N. Prentiss,	Salary,	99 61
1,028	" 1	" "	Salary,	275 39
1,029	" 1	" "	Horticultural dept., current expenses, ...	27 50
1,030	" 7	S. S. Rockwell,	Boarding Hall, current expenses,	279 38
1,031	" 7	Sanford Howard,	Salary,	41 67
1,032	" 9	Will W. Tracy,	Horticultural dept., current expenses,	100 00
1,033	" 15	S. S. Rockwell,	Boarding Hall, current expenses,	700 00
1,034	" 20	M. Miles,	Salary,	150 00
1,035	" 30	Sanford Howard, ...	Farm department, duty on Grubber,	9 70
1,036	" 30	Robert Burcham, ...	Deepening well at President's house,	12 05
1,037	" 31	M. Miles,	Farm department, current expenses; ;	.

REPORT OF THE SECRETARY OF THE
WARRANT ACCOUNT—CONTINUED.

NUMBER.	DATE.	TO WHOM DRAWN.	OBJECT.	AMOUNT.
	1888.			
1,037	Oct. 31	M. Miles,.....	Current expenses,.....	\$525 97
1,038	Nov. 5	Sanford Howard,....	Salary,.....	41 67
1,039	" 5	Will W. Tracy,.....	Salary,.....	100 00
1,040	" 5	Sanford Howard,....	Account covers No. 956,.....	14 29
			Also, expenses of the office,.....	\$42 69
			Traveling expenses,.....	21 05
			Farm department,.....	55
1,041	" 5	Sanford Howard,....	Expenses of office,	50 00
1,042	" 6	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	100 00
1,043	" 7	T. C. Abbot,	Diplomas and expenses of plate,.....	75 00
1,044	" 9	R. C. Kedzie,.....	Salary,	375 00
1,045	" 9	W. R. Kedzie,.....	Salary,.....	83 34
1,046	" 9	R. C. Kedzie,	Chemical laboratory,.....	16 80
1,047	" 9	A. J. Cook,	Expenditures, museum,.....	\$14 73
			College,.....	5 80
1,048	" 9	" "	Salary,.....	250 00
1,049	" 9	Geo. T. Fairchild,...	Salary,.....	375 00
1,050	" 16	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	200 00
1,051	" 18	Jones & Porter,.....	Insurance on buildings,.....	114 00
1,052	" 20	Will W. Tracy,.....	Salary,.....	116 67
1,053	" 21	S. S. Rockwell,.....	Boarding Hall, current expenses,.....	63 00
1,054	" 27	M. Miles,	Salary,.....	150 00
1,055	" 27	S. S. Rockwell,.....	Salary,.....	137 50
1,056	" 27	C. C. Stowe,	Salary,.....	125 00
1,057	" 27	F. H. Hume,.....	Salary,.....	90 00
1,058	" 27	C. C. Stowe,	Farm house, current expenses,.....	73 20
				<u>\$28,983 62</u>

SUMMARY OF WARRANT ACCOUNT.

1868.

Expenses of Board,.....	\$ 238 78
Salaries,.....	11,937 05
Secretary Howard—expenses of office, traveling, reports, &c.,	403 69
Farm Department. (This sum includes various payments made by the Farm Department for other departments of the College),.....	3,587 50
Horticultural Department. (This sum includes the finishing and painting of green-house and barn, as well as sundry expenditures for College Hall),.....	2,212 06
Boarding Hall. (This sum includes new roofing the Hall and very nearly all the wages paid to students for their labor),.	7,531 98
Farm House, includes building of new kitchen,.....	1,151 42
Chemical Laboratory and experiments, in charge of Prof. of Chemistry,	434 29
Library and text books,	686 50
Museum,	30 69
Ditching on Big Marsh and in Bath,	263 25
Unclassified expenditures,	456 41
	<u>\$28,933 62</u>

ESTIMATES FOR 1869.

Expenses of State Board of Agriculture,	\$ 500 00
Salaries of officers, including steward, assistant chemist, foreman on farm, garden, green-house,	12,310 00
Expenses connected with duties of Secretary of the Board,...	500 00
Labor of students,	2,500 00
Farm Department, including general expenses of care of buildings, wood, permanent improvements, and three hired hands, insurance, etc., etc.,	2,500 00
Horticultural Department, green-house, one hired man,	1,000 00
Chemical Department and Museum,	500 00
Postage, binding, printing, catalogues, &c.,	190 00
	<hr/>
	\$20,000 00
Same for 1870,	20,000 00
	<hr/>
For two years,	\$40,000 00
For new boarding hall, estimates,	31,904 70
	<hr/> <hr/>

TREASURER'S REPORT.

Joseph Mills, Treasurer, in account with State Board of Agriculture.

Dr.

1867.

Dec. 6. To cash of State Treasurer..... \$1,000 00

1868.

Jan'y 16. " " 4,000 00

" 22. " Sanford Howard, Secretary..... 531 75

Feb'y 29. " " " 894 86

" 29. " " " 865 25

March 2. " State Treasurer..... 5,000 00

" 9. " S. Howard, Secretary..... 709 50

" 21. " " " 548 48

April 3. " " " 150 00

" 30. " " " 301 00

May 16. " " " 302 30

" 26. " " " 190 00

" 28. " State Treasurer..... 5,000 00

June 9. " S. Howard, Secretary..... 778 08

" 26. " " " 221 00

July 2. " " " 96 70

" 7. " " " 87 50

" 11. " " " 185 00

" 16. " " " 302 21

" 22. " " " 44 49

" 22. " " " 75 51

Aug. 8. " " " 430 00

" 22. " " " 306 25

" 26. " " " 598 55

Sept. 1. " State Treasurer..... 5,000 00

" 10. " S. Howard, Secretary... 235 00

Oct. 20. " " " 1,037 36

Nov. 28. " " " 663 16

\$29,553 95

CR.

By paid warrant No. 858.....	\$137 50
" " 859.....	70 00
" " 870.....	218 11
" " 871.....	194 72
" " 872.....	230 00
" " 873.....	100 00
" " 874.....	150 00
" " 875.....	150 00
" " 876.....	25 00
" " 877.....	12 30
" " 878.....	100 00
" " 879.....	100 00
" " 880.....	150 00
" " 881.....	50 00
" " 882.....	41 67
" " 883.....	290 96
" " 884.....	100 00
" " 885.....	500 00
" " 886.....	40 00
" " 887.....	244 21
" " 888.....	100 00
" " 889.....	150 00
" " 890.....	50 00
" " 891.....	52 76
" " 892.....	250 00
" " 893.....	100 00
" " 894.....	41 67
" " 895.....	35 00
" " 896.....	110 00
" " 897.....	174 59
" " 898.....	200 00
" " 899.....	249 50
" " 900.....	300 00
" " 901.....	100 00
" " 902.....	55 77
" " 903.....	300 00
" " 904.....	894 86
" " 905.....	39 25
" " 906.....	175 00
" " 907.....	125 00
" " 908.....	375 00
" " 909.....	150 00
" " 910.....	250 00

By paid warrant No. 911.....	\$ 41 67
" " 912.....	137 50
" " 913.....	25 00
" " 914.....	17 00
" " 915.....	92 48
" " 916.....	745 95
" " 917.....	80 00
" " 918.....	41 67
" " 19.....	50 00
" " 920.....	181 30
" " 921.....	84 07
" " 922.....	429 41
" " 923.....	150 00
" " 924.....	29 95
" " 925.....	311 63
" " 926.....	235 31
" " 927.....	392 88
" " 928.....	9 34
" " 929.....	131 78
" " 930.....	59 65
" " 931.....	45 72
" " 932.....	81 57
" " 933.....	175 00
" " 934.....	25 20
" " 935.....	100 00
" " 936.....	150 00
" " 937.....	770 17
" " 938.....	338 74
" " 939.....	23 90
" " 940.....	41 67
" " 941.....	399 32
" " 942.....	63 65
" " 943.....	375 00
" " 944.....	225 00
" " 945.....	275 00
" " 946.....	230 14
" " 947.....	81 64
" " 948.....	83 33
" " 949.....	85 45
" " 950.....	41 66
" " 951.....	375 00
" " 952.....	137 50
" " 953.....	50 00

By paid warrant No. 954.....	\$ 125 00
" " 955.....	170 00
" " 956.....	50 00
" " 957.....	100 00
" " 958.....	10 66
" " 959.....	24 00
" " 960.....	174 73
" " 961.....	24 12
" " 962.....	137 38
" " 963.....	558 00
" " 964.....	75 00
" " 965.....	120 00
" " 966.....	222 59
" " 967.....	80 00
" " 968.....	68 13
" " 969.....	161 95
" " 970.....	180 00
" " 971.....	40 89
" " 972.....	75 00
" " 973.....	100 00
" " 974.....	187 50
" " 975.....	100 00
" " 976.....	100 00
" " 977.....	100 00
" " 978.....	316 64
" " 979.....	41 67
" " 980.....	87 50
" " 981.....	146 77
" " 982.....	88 44
" " 983.....	7 80
" " 984.....	166 07
" " 985.....	7 80
" " 986.....	39 50
" " 987.....	106 57
" " 988.....	190 28
" " 989.....	250 00
" " 990.....	4 45
" " 991.....	100 00
" " 992.....	79 50
" " 993.....	30 00
" " 994.....	375 00
" " 995.....	350 00
" " 996.....	250 00
" " 997.....	41 67

By paid warrant No. 998.....	\$ 41 66
“ “ 999.....	87 50
“ “ 1,000.....	613 72
“ “ 1,001.....	64 61
“ “ 1,002.....	72 80
“ “ 1,003.....	125 00
“ “ 1,004.....	350 00
“ “ 1,005.....	275 00
“ “ 1,006.....	150 00
“ “ 1,007.....	137 50
“ “ 1,008.....	100 00
“ “ 1,009.....	83 33
“ “ 1,010.....	100 00
“ “ 1,011.....	90 00
“ “ 1,012.....	25 00
“ “ 1,013.....	12 00
“ “ 1,014.....	281 25
“ “ 1,015.....	800 00
“ “ 1,016.....	179 27
“ “ 1,017.....	150 00
“ “ 1,018.....	27 30
“ “ 1,019.....	17 59
“ “ 1,020.....	50 00
“ “ 1,021.....	150 00
“ “ 1,022.....	100 00
“ “ 1,023.....	50 00
“ “ 1,024.....	17 10
“ “ 1,025.....	281 25
“ “ 1,026.....	61 07
“ “ 1,027.....	99 61
“ “ 1,028.....	275 39
“ “ 1,029.....	27 50
“ “ 1,030.....	279 38
“ “ 1,031.....	41 67
“ “ 1,032.....	100 00
“ “ 1,033.....	700 00
“ “ 1,034.....	150 00
“ “ 1,035.....	9 70
“ “ 1,036.....	12 05
“ “ 1,037.....	525 97
“ “ 1,038.....	41 67
“ “ 1,039.....	100 00
“ “ 1,040.....	14 29
“ “ 1,041.....	50 00

By paid warrant No. 1,042.....	\$100 00
“ “ 1,043.....	75 00
“ “ 1,044.....	375 00
“ “ 1,045.....	83 34
“ “ 1,046.....	16 80
“ “ 1,047.....	20 53
“ “ 1,048.....	250 00
“ “ 1,049.....	375 00
“ “ 1,050.....	200 00
“ “ 1,051.....	114 00
“ “ 1,052.....	116 67
“ “ 1,053.....	63 00
“ “ 1,054.....	150 00
“ “ 1,055.....	137 50
“ “ 1,056.....	125 00
“ “ 1,057.....	90 00
“ “ 1,058.....	73 20
	<hr/>
	\$29 553 95
Total debit,.....	<hr/>
	\$29,553 95
Total credit,.....	<hr/>
	<hr/>
	\$29,553 95

JOSEPH MILLS, *Treasurer.*

EXPERIMENTS IN SHEEP FEEDING.

Twelve half-blood Cotswold sheep, selected for feeding, were put in the pens, at the south end of the sheep barn, the second day of November, 1867. The pens were numbered from one to six, two sheep being placed in each. Sheep No. 1, in pen No. 1, and sheep No. 1, in pen No. 2, were ewes; the rest were wethers. Pens No. 5 and 6 were occupied by the same animals as in the experiments of the year 1867. (See Report of the Secretary of the Board of Agriculture for 1867, pages 51 and 52.)

The sheep in all the pens were got by a pure-bred Cotswold ram, out of common ewes, (grade Merinos.) The sheep in pens No. 1, 2, 3 and 4 were from five and one-half to six and one-half months old; those in pens No. 5 and 6 were between eighteen and nineteen months old. Each sheep was weighed at the beginning of the experiment, and at the close of each week. These weekly weighings were made in the morning, before feeding or watering, so as to avoid any variations that might occur from a difference in the amount of undigested food in the stomach.

The feed for each pen was carefully weighed each day at the time of feeding, and particular care was taken to prevent any waste after feeding. "Chaffed" hay was fed in each pen, so that each sheep had all it would eat; if any remained in the boxes, it was taken out, carefully weighed, and deducted from the amount fed. In addition to the chaffed hay, each pen was supplied with a fixed ration of other feed, as follows:

Pen No. 1. Shelled corn and roots, cut in narrow slices.

Pen No. 2. " " "

Pen No. 3. Shelled corn.

Pen No. 4. Roots, cut in narrow slices.

Pen No. 5. Shelled corn.

Pen No. 6. Roots, cut in narrow slices.

The hay feed was a mixture of clover and timothy; the corn was of the variety known as the yellow dent; and the roots were Skirving's Improved Swede turnip.

The weights of the sheep at the beginning of the experiment and at the close of each week, are shown in table No. 1. The weights are given in pounds and decimals of a pound.

TABLE No. 1.

WEIGHT OF SHEEP AT THE BEGINNING OF THE EXPERIMENT, AND AT THE CLOSE OF EACH WEEK.

DATE OF WEIGHING.		PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
Nov. 2d, 1887.	Beginning of Experiment	75.5	83.5	83.5	87.0	114.0	119.0
		97.0	86.0	89.5	82.5	115.0	125.0
		176.5	169.5	173.0	169.5	229.0	244.0
Nov. 9th.	1st week,...	77.0	81.5	77.5	89.0	112.5	123.5
		101.5	89.5	90.5	78.5	118.5	131.5
		178.5	171.0	168.0	167.5	231.0	250.0
Nov. 16th.	2d week,...	73.0	82.0	78.0	86.5	111.5	123.0
		96.5	86.0	89.0	77.5	122.0	125.5
		169.5	168.0	167.0	163.0	233.5	248.5
Nov. 23d.	3d week,...	73.5	81.5	79.5	87.0	118.0	121.0
		98.5	86.5	91.5	73.5	120.0	125.0
		172.0	168.0	171.0	160.5	238.0	246.0
Nov. 30th.	4th week,...	73.5	85.0	94.5	91.0	117.0	120.6
		100.5	88.0	82.0	75.0	121.5	123.0
		173.0	173.0	176.5	166.0	238.5	243.6
Dec. 7th.	5th week,...	73.5	81.0	81.0	87.5	115.0	117.0
		97.5	87.5	93.0	71.5	122.0	126.5
		171.0	168.5	174.0	159.0	237.0	243.5

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.		PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
Dec. 14th.	6th week, ..	76.5	87.5	96.0	91.0	118.0	121.6
		96.0	86.0	84.5	74.5	125.0	132.0
		172.5	173.5	160.5	165.5	243.0	253.6
Dec. 21st.	7th week, ..	79.0	82.0	94.5	89.0	116.9	121.0
		97.0	85.5	85.0	75.5	128.5	131.0
		176.0	167.5	179.5	164.5	244.5	252.0
Dec. 28th.	8th week, ..	79.0	85.0	98.0	86.5	118.0	118.5
		96.5	88.0	82.5	70.0	128.5	131.0
		175.5	173.0	180.5	156.5	246.5	249.5
Jan. 4th, '06	9th week, ..	83.0	83.5	100.5	93.0	122.0	121.5
		98.0	89.5	87.0	73.5	127.5	134.0
		181.0	173.0	187.5	165.5	249.5	255.5
Jan. 11th.	10th week, ..	83.0	82.5	101.5	89.5	124.5	121.5
		85.5	90.0	88.5	72.0	128.5	131.5
		168.5	172.5	190.0	161.5	253.0	253.0
Jan. 18th.	11th week, ..	83.5	87.5	102.5	91.0	128.0	122.5
		83.5	92.0	89.5	71.0	138.5	134.5
		167.0	179.5	192.0	162.0	266.5	257.0
Jan. 25th.	12th week, ..	83.0	86.5	102.0	92.0	126.5	123.0
		87.0	94.0	89.5	72.5	134.0	134.5
		170.0	180.5	191.5	164.5	260.5	257.5

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.		PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
Feb. 1st.	13th week.	84.5	89.0	106.5	94.5	122.5	127.5
		83.5	96.0	63.5	75.5	139.5	137.5
		168.0	187.0	200.0	170.0	272.0	265.0
Feb. 8th.	14th week.	97.5	94.0	106.5	96.0	131.0	132.5
		76.0	102.0	93.0	77.0	139.5	139.0
		173.5	196.0	199.5	173.0	270.5	271.5
Feb. 15th.	15th week.	90.0	91.5	110.5	101.0	119.5	126.5
		79.5	103.0	95.0	74.5	140.0	139.0
		169.5	194.5	205.5	175.5	269.5	265.5
Feb. 22d.	16th week.	89.5	94.0	114.0	101.5	124.0	127.5
		76.5	105.5	98.5	79.5	141.5	138.0
		166.0	199.5	212.5	181.0	275.5	265.5
Feb. 29th.	17th week.	93.0	98.0	118.0	105.5	138.0	136.0
		77.5	108.0	103.5	85.0	149.0	143.0
		170.5	206.0	221.5	190.5	287.0	278.0
March 7th.	18th week.	95.0	100.0	117.5	106.5	135.5	133.0
		79.0	110.5	102.5	85.0	146.0	135.5
		174.0	210.5	220.0	189.5	281.5	268.5
March 14th.	19th week.	94.0	101.0	119.5	106.0	138.0	135.0
		85.0	111.0	104.5	84.0	147.5	139.0
		182.0	212.0	224.0	190.0	285.5	274.0

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.		PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
March 21st.	20th week, ..	96.5	98.5	123.0	110.0	134.0	133.5
		82.0	113.0	105.5	84.0	145.0	143.0
		173.5	210.5	233.5	194.0	279.0	276.5
March 23th.	21st week, ..	100.5	105.5	129.5	114.5	143.5	137.5
		81.0	116.5	110.5	91.5	154.0	144.0
		181.5	223.0	240.0	206.0	297.5	281.5
April 4th.	22d week, ..	102.5	106.0	131.5	113.0	144.0	137.0
		83.0	117.5	115.0	89.5	153.0	143.5
		185.5	223.5	246.5	202.5	297.0	280.5
April 11th.	23d week, ..	107.5	108.0	135.5	120.5	147.0	144.0
		86.5	119.5	120.5	91.0	157.0	152.0
		194.0	227.5	255.0	211.5	304.0	298.0
April 18th.	24th week, ..	106.5	106.0	134.0	113.0	147.0	130.0
		82.5	116.0	117.5	88.0	159.0	153.5
		189.0	224.0	251.5	206.0	306.0	308.5
April 24th.	25th week, ..	106.5	105.0	134.5	113.5	144.0	143.0
		78.0	115.5	114.5	85.5	153.5	143.5
		184.5	220.5	249.0	204.0	302.5	290.5
May 1st.	26th week, ..	108.0	111.5	137.5	123.0	146.0	141.5
		80.5	120.0	124.0	84.5	160.0	150.0
		188.5	231.5	261.5	207.5	306.0	291.5

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.		PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
May 8th.	27th week.,	108.5	111.0	187.0	122.0	188.0	141.0
		78.0	120.5	122.0	85.5	164.5	151.5
		186.5	231.5	269.0	207.5	302.5	292.5
May 15th.	28th week.,	110.0	110.0	138.5	124.5	115.5	143.0
		78.5	122.0	128.0	85.0	163.0	158.5
		188.5	232.0	261.5	209.5	278.5	295.5
May 22d.	29th week.,	112.0	110.5	138.0	124.0	110.5	143.0
		79.5	122.0	123.5	80.5	162.0	153.0
		191.5	232.5	261.5	204.5	272.5	296.0
May 29th.	30th week.,	113.0	114.0	139.5	123.0	.....	143.0
		77.0	123.0	132.0	76.0	162.0	152.0
		190.0	237.0	271.5	199.0	162.0	294.0
June 5th.	31st week.,	114.0	111.0	136.0	123.0	.....	146.0
		.....	123.0	125.0	70.5	160.0	154.5
		114.0	234.0	261.0	192.5	160.0	300.5

Considerable variation in the rate of increase will be observed in all the pens, while losses in weight, even in the animals that made the greatest aggregate gain, are frequent. The sheep in pen No. 1, did not do well from the very commencement of the experiment. No. 2 lost 20 lbs. in weight, and was finally removed from the pen before the close of the experiment. Sheep No. 2, in Pen No. 4, lost 12 lbs., although it did not at any time appear to be sick. Sheep No.

1, in Pen No. 5, was not well for several weeks before the close of the experiment, and was finally removed from the pen at the close of the 29th week.

It is exceedingly difficult to conduct any kind of experiment in practical agriculture in a satisfactory manner, from the great variety of circumstances that tend to modify results; but when the subtle principle of life, as exhibited in animated beings is involved in the line of investigation, the difficulties in the way of exact determinations seem almost insuperable.

At the beginning of feeding experiments, before the animals become accustomed to the new conditions in which they are placed, losses almost invariably occur. It was observed in the present experiment, that any unusual disturbance of the other animals in the same building, had a marked effect on the progress of those under experiment. It will be observed that losses occurred in all the pens after the 23d week. The only cause that could be assigned for these losses, was the change in the management of the other sheep in the same building.

About the commencement of the 24th week, the sheep not under experiment were turned out during the day, and returned to the barn at night. The experimental sheep immediately became restless during the day, and a general loss in weight was observed, notwithstanding an increase in the fixed ration of food, so that it was thought best to terminate the experiment sooner than had before been intended. From our experience thus far in experimental feeding, it seems desirable that a separate building be provided for this purpose, and that but a single animal be placed in each pen.

In Table No. 2 is shown the amount of feed consumed in each pen, for each week of the experiment.

TABLE No. 2.

AMOUNT OF FEED CONSUMED IN EACH PEN FOR EACH WEEK OF THE EXPERIMENT.

WEEK.	PEN No. 1.			PEN No. 2.			PEN No. 3.		PEN No. 4.		PEN No. 5.		PEN No. 6.		
	Roots.	Corn.	Hay.	Roots.	Corn.	Hay.	Corn.	Hay.	Roots.	Hay.	Corn.	Hay.	Roots.	Hay.	
1st,	8.70	3.00	22.56	15.00	3.00	22.00	6.25	16.50	23.50	21.60	9.75	29.00	43.75	34.00	1
2d,	13.75	2.75	19.00	13.75	2.75	17.00	5.50	18.00	27.50	21.25	8.25	24.00	41.25	30.50	2
3d,	17.50	3.75	20.10	17.50	3.50	20.65	7.00	21.60	35.00	22.72	10.50	23.63	52.50	23.04	3
4th,	17.50	3.50	20.50	17.50	3.50	17.55	7.00	22.97	35.00	24.10	10.50	27.00	52.50	23.10	4
5th,	17.10	3.50	16.35	17.50	3.50	18.00	7.00	20.13	35.00	20.25	10.50	24.75	52.50	25.25	5
6th,	29.50	4.50	18.00	29.50	4.50	18.97	10.00	23.00	56.00	13.69	13.50	23.73	82.50	26.85	6
7th,	39.50	5.25	14.00	39.50	5.25	13.80	12.25	21.83	71.75	15.69	15.75	24.44	105.00	17.82	7
8th,	33.50	5.25	16.41	33.50	5.25	16.73	12.25	20.75	75.87	10.44	15.75	25.94	105.00	23.83	8
9th,	33.50	5.25	18.57	33.50	5.25	20.54	12.25	24.83	71.75	16.83	15.75	23.79	105.00	27.33	9
10th,	33.50	5.25	11.19	33.50	5.25	13.79	12.25	25.50	71.75	13.04	15.75	22.10	105.00	27.19	10
11th,	33.50	5.25	11.32	33.50	5.25	19.50	12.25	23.04	71.75	15.32	15.75	22.19	105.00	26.75	11
12th,	33.50	5.25	14.04	33.50	5.25	25.04	12.25	27.00	71.75	20.13	15.75	33.25	105.00	30.79	12
13th,	33.50	5.25	11.32	33.00	5.25	26.75	12.25	29.50	70.13	21.33	15.75	37.50	105.00	31.75	13
14th,	33.50	5.25	7.00	33.50	5.25	23.50	12.25	26.94	71.75	21.63	15.75	37.50	105.00	31.50	14

TABLE No. 2—CONTINUED.

WEEK	PEN No. 1.			PEN No. 2.			PEN No. 3.		PEN No. 4.		PEN No. 5.		PEN No. 6.		
	Roots.	Corn.	Hay.	Roots.	Corn.	Hay.	Corn.	Hay.	Roots.	Hay.	Corn.	Hay.	Roots.	Hay.	
15th,	33.50	5.25	12.75	33.50	5.25	29.32	12.25	32.00	77.00	24.94	15.75	46.00	105.00	26.25	15
16th,	33.50	5.25	10.50	33.50	5.25	30.25	12.25	34.38	77.00	25.25	15.75	40.75	105.00	23.44	16
17th,	33.50	5.25	11.25	33.50	5.25	31.07	12.25	33.25	72.50	26.32	15.75	37.04	105.00	30.66	17
18th,	33.50	5.25	15.62	33.50	5.25	33.00	12.25	34.81	72.50	29.18	15.75	33.06	105.00	29.06	18
19th,	33.50	5.25	12.93	33.50	5.25	32.63	12.25	36.75	72.12	29.25	15.75	32.00	105.00	29.31	19
20th,	33.50	5.25	15.18	33.50	5.25	35.87	12.25	40.87	71.75	31.31	15.75	30.18	104.00	32.75	20
21st,	33.50	5.25	19.25	33.50	5.25	37.00	12.25	40.56	71.75	32.87	15.75	36.56	105.00	34.12	21
22d,	49.00	7.00	15.12	49.00	7.00	38.41	15.56	37.68	91.00	27.06	17.50	32.81	119.00	25.31	22
23d,	49.00	7.00	16.18	49.00	7.00	39.43	15.75	37.37	91.00	26.37	17.50	33.56	119.00	33.56	23
24th,	49.00	7.00	12.62	49.00	7.00	26.69	15.75	34.18	91.00	26.62	17.50	33.50	119.00	31.94	24
25th,	49.00	7.00	8.06	48.75	7.00	23.12	15.75	26.31	91.00	20.56	17.50	27.12	117.96	24.62	25
26th,	49.00	7.00	10.18	48.75	7.00	24.12	15.62	28.12	90.68	23.93	17.50	27.56	118.18	21.56	26
27th,	62.00	8.62	9.25	62.00	8.62	21.75	17.37	27.68	104.00	20.25	19.12	12.98	189.36	22.37	27
28th,	63.60	8.75	9.18	63.00	8.75	20.18	17.50	24.68	106.00	20.12	7.31	10.23	180.87	26.80	28

29th,	63.00	8.75	7.31	63.00	8.75	17.31	17.50	22.25	105.00	15.87	10.50	10.31	130.25	25.50	29
30th,	63.00	8.75	7.31	63.00	8.75	19.08	17.50	23.12	105.00	11.56	10.50	10.75	131.06	23.75	30
31st,	40.00	5.31	8.31	63.26	8.75	19.75	17.75	20.31	105.00	13.25	9.75	6.02	120.50	22.02	31

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The average weight of the sheep in each pen, for each week of the experiment is given in table No. 3. The average weight for the week is obtained by adding the weight at the beginning of the week, to the weight at the close of the week, and dividing the sum by two.

TABLE No. 3.

AVERAGE WEIGHT OF SHEEP IN EACH PEN FOR EACH WEEK.

WEEK.	PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
1st.....	177.00	170.25	170.50	165.50	220.00	251.50
2d.....	173.50	169.50	167.50	165.25	222.25	253.75
3d.....	170.25	168.00	169.00	162.00	225.75	247.25
4th.....	172.50	170.50	173.75	163.50	228.25	247.00
5th.....	172.00	170.75	175.25	162.50	227.75	245.75
6th.....	171.75	171.00	177.25	162.25	240.00	246.50
7th.....	174.25	170.50	180.00	165.00	242.75	251.75
8th.....	175.75	170.25	180.00	160.50	245.50	250.75
9th.....	173.25	173.00	183.75	160.00	248.00	252.50
10th.....	174.75	172.75	188.75	162.50	251.25	254.25
11th.....	167.75	176.00	191.00	161.75	257.25	255.00
12th.....	168.50	180.00	191.75	163.25	261.00	257.25
13th.....	169.00	183.75	195.75	167.25	258.25	261.25
14th.....	170.75	191.50	199.75	171.00	271.25	268.25
15th.....	171.50	195.25	202.50	174.25	270.00	266.50
16th.....	167.75	197.00	209.00	173.25	272.50	265.50
17th.....	168.25	202.75	217.00	185.75	281.25	271.75
18th.....	173.25	208.25	220.75	180.00	284.25	273.25
19th.....	178.00	211.25	222.00	189.75	281.00	271.25
20th.....	180.25	211.25	226.25	192.00	279.25	275.00
21st.....	180.00	216.25	234.25	200.00	288.25	278.75
22d.....	183.50	222.75	243.25	204.25	297.25	281.00
23d.....	189.75	225.50	251.25	207.00	300.50	283.25
24th.....	191.50	225.75	253.75	208.75	305.00	289.75
25th.....	186.75	222.25	250.25	205.00	304.25	297.00
26th.....	185.50	226.00	255.25	205.75	304.25	291.00
27th.....	187.50	221.50	260.25	207.50	304.25	292.00
28th.....	187.50	221.75	260.25	206.50	290.50	294.00
29th.....	190.00	222.25	261.50	207.00	275.50	295.75
30th.....	190.75	224.75	266.50	201.75	277.25	295.00
31st.....	192.00	225.50	263.25	195.50	161.00	297.25

In comparing the amount of food consumed in the different pens each week, and the amount of food consumed at different periods in the same pen, it becomes necessary to bring the weights of the sheep to a uniform standard. One hundred pounds of live weight is taken as a convenient standard of comparison in the following table, (No. 4,) which gives the amount of food consumed each week, for each 100 pounds of live weight.

This table is formed from tables Nos. 2 and 3, by a simple proportion. For example, in Pen No. 4, the average weight of the sheep the first week, according to table No. 3, is 168.50 pounds. The weight of roots consumed in this pen for the week, according to Table No. 2, is 28.50 pounds. The amount of roots consumed by each 100 pounds of live weight, may be found as follows:

$$\begin{array}{r}
 168.50 : 100 \text{ lbs.} :: 28.50 \\
 \hline
 100 \\
 168.50 \times 2850.00 (16.91 \text{ lbs. of roots consumed for each } 100 \text{ lbs. of live weight.}) \\
 \hline
 16850 \\
 \hline
 116500 \\
 101100 \\
 \hline
 154000 \\
 151650 \\
 \hline
 23500 \\
 16850 \\
 \hline
 6650
 \end{array}$$

By reference to Table No. 2, it will be seen that an increase in the fixed ration of corn and roots, was made the 7th week, and again the 22d week. The object of this increase was to make the fixed ration very nearly the same for each 100 lbs. of live weight throughout the experiment, so that any variation in the amount of feed required during the different periods of feeding, would be shown in the hay consumed. The fluctuations in the weight of the sheep from week to week, were, however, so frequent as to prevent a complete adjustment of the fixed ration, to the weight of the animal.

TABLE No. 4.

AMOUNT OF FOOD CONSUMED PER WEEK FOR EACH ONE HUNDRED POUNDS LIVE WEIGHT.

WEEK.	PEN No. 1.			PEN No. 2.			PEN No. 3.		PEN No. 4.		PEN No. 5.		PEN No. 6.	
	Roots.	Corn.	Hay.	Roots.	Corn.	Hay.	Corn.	Hay.	Roots.	Hay.	Corn.	Hay.	Roots.	Hay.
1st,	4.91	1.69	12.74	8.51	1.76	12.92	3.66	9.68	16.91	19.76	4.24	12.61	19.35	13.52
2d,	7.92	1.53	10.95	3.11	1.62	10.02	3.28	10.74	16.64	12.86	3.55	10.76	16.26	13.20
3d,	10.27	2.20	11.80	10.41	2.08	12.29	4.04	12.78	21.60	14.02	4.45	12.16	21.23	11.84
4th,	10.14	2.02	11.83	10.20	2.05	10.29	4.02	13.22	21.40	14.74	4.48	11.83	21.26	11.54
5th,	10.17	2.03	9.50	10.24	2.04	10.54	3.99	11.48	21.54	12.46	4.41	10.41	21.86	10.28
6th,	17.17	2.62	10.83	17.25	2.63	11.09	5.64	12.90	24.51	11.52	5.63	11.99	32.79	10.80
7th,	22.09	3.00	8.43	22.58	3.03	7.97	6.80	12.11	43.49	9.51	6.45	10.63	41.54	7.05
8th,	21.90	2.98	9.33	22.61	3.06	9.82	6.90	11.53	47.27	6.50	6.41	10.86	41.87	9.49
9th,	21.59	2.94	10.04	22.25	3.03	11.87	6.66	13.23	44.84	10.55	6.26	11.60	41.53	10.84
10th,	22.03	3.00	6.40	23.28	3.03	10.37	6.49	13.69	44.15	11.11	6.27	11.58	41.22	10.59
11th,	22.95	3.12	7.04	21.87	2.98	11.07	6.41	12.06	44.36	9.46	6.12	11.35	41.17	10.49
12th,	22.84	3.11	8.33	21.38	2.91	13.91	6.33	14.08	43.96	12.33	6.04	12.74	41.20	11.97
13th,	23.78	3.10	6.99	20.63	2.85	14.55	6.25	15.07	42.53	13.03	5.92	14.13	40.19	12.15
14th,	22.64	3.07	4.80	20.10	2.74	14.33	6.13	14.49	41.34	12.61	5.87	13.82	39.07	11.74

14th,	22.44	3.06	7.45	19.71	2.68	15.01	6.66	19.80	44.19	14.31	5.56	14.81	39.12	9.70	16
16th,	22.56	3.12	6.36	19.64	2.66	15.28	5.86	16.45	43.19	14.16	5.78	14.96	39.56	8.06	16
17th,	22.88	3.18	6.63	18.49	2.58	15.33	5.64	15.32	39.08	14.17	5.60	13.17	38.64	11.28	17
18th,	22.35	3.06	9.07	18.49	2.62	15.84	5.58	16.77	38.16	15.36	5.54	11.63	38.48	10.63	18
19th,	21.63	2.96	7.27	18.22	2.48	15.47	5.52	16.56	38.01	15.41	5.60	11.38	28.71	10.80	19
20th,	21.36	2.91	10.06	18.22	2.48	16.98	5.86	18.06	37.37	16.31	5.64	10.81	37.82	11.91	20
21st,	21.39	2.92	10.69	17.80	2.43	17.11	5.28	17.31	35.87	16.48	5.41	12.63	37.63	12.24	21
22d,	26.70	3.81	8.24	21.54	3.14	14.99	6.35	15.49	44.55	13.24	5.83	11.03	42.35	9.01	22
23d,	25.83	3.69	8.52	21.73	3.10	13.49	6.37	14.97	43.96	12.74	5.82	11.13	41.28	11.64	23
24th,	25.65	3.65	6.59	21.70	3.09	11.82	6.27	13.47	43.59	12.27	5.73	10.98	39.69	10.65	24
25th,	26.28	3.74	4.26	21.98	3.14	9.96	6.28	10.51	44.39	10.02	5.75	8.91	39.70	8.28	25
26th,	26.27	3.75	5.45	21.57	3.09	10.67	6.11	11.01	44.07	11.63	5.75	9.05	49.61	7.40	26
27th,	33.06	4.59	4.93	26.78	3.72	9.82	6.67	10.63	50.12	9.75	6.28	4.24	44.60	7.68	27
28th,	33.90	4.66	4.89	27.18	3.77	8.70	6.72	9.48	50.35	9.64	2.51	3.52	44.51	8.67	28
29th,	33.15	4.60	4.11	27.12	3.76	7.45	6.49	8.50	50.72	7.66	3.51	3.74	44.04	8.62	29
30th,	33.02	4.58	4.09	26.83	3.72	8.48	6.56	8.67	52.04	5.72	6.41	6.63	44.43	8.05	30
31st,	35.24	4.67	7.32	26.43	3.71	8.38	6.66	7.63	53.70	6.77	6.06	4.11	40.53	7.60	31

TABLE No. 4.

AMOUNT OF FOOD CONSUMED PER WEEK FOR EACH ONE HUNDRED POUNDS LIVE WEIGHT.

WEEK.	PEN No. 1.			PEN No. 2.			PEN No. 3.		PEN No. 4.		PEN No. 5.		PEN No. 6.	
	Roads.	Corn.	Hay.	Roads.	Corn.	Hay.	Corn.	Hay.	Roads.	Hay.	Corn.	Hay.	Roads.	Hay.
1st,	4.91	1.69	12.74	8.51	1.76	12.92	8.66	9.66	16.91	12.76	4.24	12.61	19.35	12.53
2d,	7.92	1.53	10.96	8.11	1.62	10.02	8.23	10.74	16.64	12.86	3.55	10.76	16.26	12.20
3d,	10.27	2.20	11.90	10.41	2.06	12.20	4.04	12.78	21.60	14.02	4.45	12.16	21.23	11.54
4th,	10.14	2.02	11.88	10.20	2.05	10.20	4.02	13.22	21.40	14.74	4.48	11.33	21.25	11.54
5th,	10.17	2.03	9.50	10.24	2.04	10.54	3.99	11.43	21.54	12.46	4.41	10.41	21.26	10.23
6th,	17.17	2.62	10.83	17.25	2.63	11.09	5.64	12.90	34.51	11.52	5.63	11.99	32.79	10.80
7th,	22.09	3.00	8.43	22.58	3.03	7.97	6.80	13.11	43.49	9.51	6.46	10.63	41.54	7.95
8th,	21.90	2.93	9.33	22.61	3.03	9.82	6.80	11.53	47.27	6.50	6.41	10.56	41.87	9.49
9th,	21.56	2.94	10.04	22.25	3.03	11.87	6.66	13.26	44.84	10.55	6.26	11.60	41.53	10.54
10th,	22.63	3.00	6.40	22.28	3.03	10.87	6.49	13.59	44.15	11.11	6.27	11.53	41.22	10.60
11th,	22.95	3.12	7.04	21.87	2.93	11.07	6.41	12.06	44.36	9.46	6.12	11.35	41.17	10.49
12th,	22.54	3.11	8.33	21.33	2.91	13.91	6.33	14.03	43.95	12.33	6.04	12.74	41.20	11.97
13th,	22.73	3.10	6.69	20.23	2.85	14.55	6.25	15.07	42.53	13.03	5.92	14.12	40.19	12.16
14th,	22.54	3.07	4.50	20.10	2.74	14.83	6.13	14.49	41.84	12.61	5.87	13.62	39.07	11.74

15th,	22.44	3.06	7.43	19.71	2.06	16.01	6.66	16.80	44.19	14.31	6.96	14.81	39.12	9.70	15
16th,	22.95	3.13	6.36	19.64	2.06	16.38	6.86	16.45	43.19	14.16	6.76	14.96	39.55	8.06	16
17th,	22.88	3.13	6.68	18.49	2.43	15.33	6.64	16.33	39.08	14.17	6.80	13.17	38.64	11.36	17
18th,	22.35	3.06	9.07	18.49	2.62	15.84	6.56	15.77	38.16	15.36	6.54	11.66	38.43	10.03	18
19th,	21.68	2.96	7.37	18.22	2.43	15.47	6.52	16.56	38.01	15.41	6.60	11.38	23.71	10.80	19
20th,	21.36	2.91	10.03	18.32	2.43	16.98	6.86	18.06	37.37	16.31	6.64	10.81	37.82	11.91	20
21st,	21.39	2.92	10.69	17.90	2.43	17.11	6.23	17.31	35.87	16.43	6.41	15.68	37.63	12.24	21
22d,	26.70	3.81	8.24	21.54	3.14	14.99	6.35	15.49	44.55	18.24	6.88	11.03	42.35	9.01	22
23d,	25.83	3.69	8.52	21.73	3.10	13.49	6.37	14.87	43.96	12.74	6.82	11.13	41.28	11.64	23
24th,	25.65	3.65	6.59	21.70	3.09	11.82	6.27	13.47	43.59	12.27	6.73	10.98	39.69	10.65	24
25th,	26.23	3.74	4.26	21.98	3.14	9.96	6.28	10.51	44.39	10.02	6.75	8.91	39.70	8.28	25
26th,	26.27	3.75	6.45	21.57	3.09	10.67	6.11	11.01	44.07	11.63	6.76	9.05	40.61	7.40	26
27th,	23.06	4.69	4.98	26.76	3.72	9.82	6.67	10.63	50.13	9.75	6.28	4.24	44.60	7.06	27
28th,	23.90	4.66	4.89	27.18	3.77	8.70	6.72	9.43	50.35	9.64	6.21	3.52	44.51	8.67	28
29th,	23.16	4.60	4.11	27.12	3.76	7.45	6.49	8.50	50.72	7.66	6.31	3.74	44.04	8.02	29
30th,	23.02	4.58	4.09	26.83	3.72	8.43	6.56	8.67	52.04	5.72	6.41	6.03	44.43	8.06	30
31st,	25.24	4.67	7.32	26.43	3.71	8.36	6.66	7.62	53.70	6.77	6.06	4.11	40.53	7.69	31

TABLE No. 5.

SUMMARY OF THE RESULTS OF EXPERIMENTS FOR EACH PEN, INCLUDING THE TOTAL GAIN, ETC.

NUMBER OF PEN AND DESCRIPTION OF FEED CONSUMED.	Weight of Sheep, Nov. 24, 1867.	Greatest Weight.	Total Gain.	Gain Per Cent.	Total Feed Con- sumed.	Total Value of Feed consumed.	Av. Am't of Feed consumed per Week, by each 100 lbs. of live Weight.	Value of Feed con- sumed per Week, for each 100 lbs. live weight.	Weight of Wool.	Value of Wool at 30 cents per lb.	Incr. in live weight after deducting the weight of wool, lbs.	Value of Feed for each 100 lbs. incr. of live weight, ex- cept of wool.
No. 1. Roots, Corn, Hay,	176.50	200.00	24.5	13.96	Roots, 1,217.95	\$2.03	Roots, 20.92	0.03.5	22.0	26.00	2.5	\$44.80
					Corn, 174.93	8.12	Corn, 3.00	0.05.4				
					Hay, 457.03	2.56	Hay, 7.38	0.04.4				
						\$7.71		\$0.12.3				
No. 2. Roots, Corn, Hay,	189.50	227.00	67.60	36.83	Roots, 1,245.50	\$2.08	Roots, 19.77	\$0.03.3	24.75	\$7.43	42.75	\$5.43
					Corn, 178.12	3.18	Corn, 2.82	0.05.0				
					Hay, 749.61	4.49	Hay, 11.89	0.07.0				
						\$9.75		\$0.16.2				

No. 3 Corn and Hay,.....	173.00	261.00	88.07	50.96	Corn, 392.55 Hay, 837.48	\$7 00 5 14 \$12 14	Corn, 5.88 Hay, 12.75	0.10.4 0.07.7 \$0.18.1	20.0	\$7 80	62.00	\$7 00
No. 4 Roots and Hay,.....	100.50	215.00	45.50	26.84	Roots, 2,296.80 Hay, 672.33	\$3 51 4 08 \$7 84	Roots, 38.87 Hay, 11.25	0.06.0 0.06.8 \$0.12.8	20.25	\$6 08	25.25	\$9 97
No. 5 Corn and Hay,.....	229.00	311.50	82.50	36.02	Corn, 443.08 Hay, 862.92	\$7 92 6 17 \$13 09	Corn, 5.30 Hay, 10.50	0.09.5 0.06.0 \$0.15.5	22.25	\$6 08	60.25	\$10.64
No. 6 Roots and Hay,.....	244.00	300.50	56.50	23.16	Roots, 2,140.04 Hay, 832.46	\$5 23 6 11 \$10 34	Roots, 37.20 Hay, 10.10	0.06.0 0.06.0 \$0.12.0	20.50	\$6 15	36.00	\$11 64

In the foregoing table, (No. 5,) a summary of the results of the experiment is given for each pen, including the total gain, gain per cent., total feed consumed, value of feed consumed, average amount of feed consumed per week for each 100 lbs. of live weight; the value of feed consumed per week for each 100 lbs. of live weight, the weight of wool and its value, the total increase in live weight after deducting the weight of wool, and the value of feed consumed to produce 100 lbs. of increase of live weight exclusive of wool. In making this table, hay has been estimated at \$12 00 per ton; corn at \$1 00 per bushel, and roots at 10 cts. per bushel.

In the experiments of last year, roots were estimated at 16 cts. per bushel, which is undoubtedly much too high when compared with corn at \$1 00 per bushel. The amount of dry substance is perhaps the best standard we now have for estimating the relative feeding value of different foods. From a comparison of the amount of dry substance in corn and roots, it will be seen that nearly nine bushels of roots will be required to equal a bushel of corn. With corn at \$1 00 per bushel, roots should be worth about 11 cts. per bushel. As ten was a convenient factor to use in making the table, the price of the roots was fixed at 10 cts. per bushel.

By comparing the figures in the last column of the table in Pens No's 3 and 4, and in Pens No's 4 and 5, it will be seen that the relative value of the corn and roots is very nearly as estimated, so far at least as the results of this experiment are concerned.

The sheep were all sheared at the close of the experiment, June 6th, and the fleeces carefully weighed, with the exception of sheep No. 2, in Pen No. 1, and sheep No. 1, in Pen No. 5, which had been removed from the pen on account of sickness. The fleeces of these sheep were not in condition for accurate

weighing, and they were therefore entered on the record at a low estimate. It should be stated that the sheep were all thoroughly "tagged," several weeks before shearing. In Table No. 6, the weight of each fleece unwashed, is given.

TABLE No. 6.

WEIGHT OF FLEECES IN POUNDS, AND DECIMALS OF A POUND.

NO. OF SHEEP.	PEN No. 1.	PEN No. 2.	PEN No. 3.	PEN No. 4.	PEN No. 5.	PEN No. 6.
Sheep No. 1,.....	12.00	14.25	13.25	12.75	Est. 9.00	9.50
Sheep No. 2,.....	Est. 10.00	10.50	12.75	7.50	12.25	11.00

The wool was of good quality, free from gum or dirt, and from the length of fibre, well adapted to the manufacture of delaines, or for combing purposes. The wool has not been sold. [See supplement at end of chapter.] The estimated value in Table No. 5, is, without doubt, considerably below the present market price.

The sheep in Pens Nos. 5 and 6, as has already been stated, were fed in the same pens in the experiment of 1867. In the following table (No. 7), the results of the combined experiments are given, including the total gain from the beginning of the first to the close of the last experiment, the total weight and value of wool produced, the total gain in live weight, exclusive of the wool of 1868, the total value of feed consumed, the total value of feed consumed less the value of wool, and the cost of 100 lbs. increase of live weight, exclusive of wool.

TABLE No. 7.

PEN.	Total gain from Dec. 12, 1866, to June 6, 1868.	Total wool produced.	Value of wool at 30c. per lb.	Total increase of live weight, exclusive of wool.	Total value of feed consumed.	Total value of feed, less the value of wool.	Cost of 100 pounds of increase of live weight, exclusive of wool.
No. 5,.....	153.50	42.25	\$12.68	131.25	\$39.54	\$10.86	28.27
No. 6,.....	120.00	27.00	11.31	112.50	17.50	5.28	5.30

In the preceding tables, the value of the animal, or its actual cost at the commencement of the experiment, has not been taken into account.

The results of our experiments in pig feeding, show conclusively that animals when properly fed, give a much better return for the feed consumed, during the first few months of their lives, than they do after they reach maturity. There is not within my knowledge any definite statement on record, of the actual cost of the growth of lambs up to the period of maturity. As this must be an important item in determining the profits of sheep raising, I propose to make it a special subject of investigation, as soon as facilities for conducting the experiments in a satisfactory manner are placed at my disposal.

In the absence of accurate data, the cost of the growth of the sheep, at the beginning of the experiments, has been estimated at two dollars per head at the age of six and one-half months, and at two dollars and forty cents per head, at the age of eight months. As the lambs had been in the pasture during the summer, without any artificial feed, the estimate will probably be considered high enough to cover the actual cost of their growth.

In Table No. 8 is given the results of the period of experimental feeding, combined with the preliminary period as above estimated. The greatest weight of the sheep is given in the second column, as it is a fairer representation of the return for the feed consumed, than the weight at the close of the experiment, when losses had been made, as before explained.

TABLE No. 8.

NO. OF PEN.	Greatest weight of Sheep.	Weight of Wool.	Greatest weight of Sheep after deducting the weight of Wool for 1868.	Age of Sheep at close of experiment, in months.	Estimated cost of Sheep at beginning of experiment.	Cost of feed during the experiments.	Total value of Wool, at 30c per lb.	Total cost of Sheep, after deducting the value of Wool.	Cost of 100 lbs. of live weight, exclusive of Wool.
No. 1.									
2 half-blood Cotswolds, 6½ months old. Roots, Corn and Hay.	200.00	22.00	178.00	13½	\$4.00	\$7.71	\$6.00	\$6.11	\$3.87
No. 2.									
2 half-blood Cotswolds, 6½ months old. Roots, Corn and Hay.	227.00	24.75	202.25	13½	\$4.00	\$9.75	\$7.43	\$9.33	\$3.96
No. 3.									
2 half-blood Cotswolds, 6½ months old. Corn and Hay.	261.00	26.00	235.00	13½	\$4.00	\$12.14	\$7.80	\$3.34	\$3.55
No. 4.									
2 half-blood Cotswolds, 6½ months old. Roots and Hay.	215.00	20.25	194.75	13½	\$4.00	\$7.84	\$6.06	\$5.70	\$3.96

No. 5. 2 half-blood Cotswolds, 8 months old. Cora and Hay.	\$11.50	\$2.25	\$20.25	25 1/2	\$4.80	\$22.54	\$12.03	\$15.03	\$5.41
No. 6. 2 half-blood Cotswolds, 8 months old. Rosa and Hay.	\$30.50	\$7.00	\$20.00	25 1/2	\$4.80	\$17.59	\$11.31	\$11.03	\$3.96

The average cost of 100 lbs. live weight, exclusive of the wool, is \$3.11 at the age of thirteen and one-half months, as shown in Pens No's 1, 2, 3 and 4, while the average cost is \$4.70 at the age of twenty-five and one-half months, as shown in Pens No's 5 and 6.

A single experiment is not, of course, sufficient to establish a principle of feeding, as variations in the feeding qualities of the animals under experiment may produce greater differences than those above noted. The marked agreement, however, of the results given in Table No. 8, with the experiments here in pig-feeding, in 1866, and in 1868, and with the extensive series of experiments in the feeding of sheep, oxen and pigs, conducted by Messrs. Lawes & Gilbert, in England, would indicate that the difference in the cost of production is owing to a difference in the maturity of the animals.

For the further illustration of this fact, the experiments in pig-feeding, which follow, may be examined. A comparison of the figures in the last column of Table No. 8, will show that on the average, the roots, corn and hay gave the best return; the roots and hay the next best return, and that the corn and hay alone gave the least return on their estimated value.

SUPPLEMENT TO REPORT ON EXPERIMENTS IN SHEEP FEEDING.

Since the above report was placed in the hands of the printer, our wool has been sold in Boston.

The Grade Cotswold wool from the experimental sheep, sold at 44 cents per lb., while the Merino and Grade Merino sold at 33 cents per lb. (all unwashed).

After deducting freight, commissions, &c., say 4 cents per lb., the value of the wool here should be reckoned at 40 cents per lb., instead of 30c, the price estimated in the tables.

The following corrections should therefore be made in the tables:

Correction of Table No. 7.

PEN.	Total value of wool, at 40 cents per lb.	Total value of feed, less the value of wool.	Cost of 100 lbs. in- crease of live weight, exclusive of wool.
No. 5,.....	\$16 90	\$6 04	\$6 08
No. 6,.....	15 08	2 51	2 12

Corrections in Table No. 8.

PEN	Total value of wool, at 40 cents per lb.	Total cost of sheep after deducting the value of wool.	Cost of 100 lbs. of live weight, exclusive of wool.
No. 1,	\$5 80	\$2 91	\$1 08
No. 2,	9 90	3 85	1 81
No. 3,	10 40	5 74	2 44
No. 4,	8 10	3 74	1 92
No. 5,	16 90	11 44	3 98
No. 6,	15 08	7 31	2 01

To make the above statements complete, a charge should be made for attendance, and a credit given for the manure produced. As these items cannot be ascertained with sufficient accuracy to add to the value of the experiment, they have therefore been omitted altogether.

M. MILES.

EXPERIMENTS IN PIG FEEDING.

Six grade Essex sow pigs, two weeks old, all of the same litter, were taken from their dam on the evening of May 23d, and placed in a pen for experimental feeding. On the morning of the 24th they weighed collectively, twenty-two and one-half pounds. They were fed on milk, which was wasted to a considerable extent the first two days, while they were learning to drink, so that the experiment was not commenced until the morning of the 26th, when they weighed together, before feeding, twenty-five pounds.

The pigs were got by an Essex boar belonging to the College Farm, out of a sow that was supposed to be three-fourths Essex. The pigs were so nearly alike in appearance that it was difficult to perceive any difference, in either form or quality.

The feed was carefully weighed each day, and the pigs were weighed at the close of each week, in the morning, before feeding.

On the morning of June 9th, two pens of the same size were provided and three pigs were placed in each pen. As there was a slight difference at this time in the apparent size of the pigs, the three heaviest were placed in the pen marked A, and the three lightest were placed in the pen marked B. On weighing, it was found that the three in pen A, weighed 34.5 lbs., and the three in pen B, weighed 40.5 lbs.

The feed throughout the experiment was the same for each pen, to the close of the 24th week, when a limited ration of roots was given to the pigs in pen A. A few oats were fed the 4th and 5th weeks, but as they were not readily eaten, a small quantity of shelled corn was substituted at the beginning of

the sixth week. The corn produced scours in all the pigs, so that it was not fed the third day. The scouring immediately stopped, and the corn was again given in diminished quantity. As it was not readily eaten in pen B, and was rejected entirely in pen A, corn meal was substituted the seventh week.

As the pigs became used to the meal, the quantity was gradually increased, while the milk was diminished, until the close of the 8th week, when it was entirely discontinued. The feed in both pens, from the beginning of the 9th week to the close of the 24th week, was corn meal and water exclusively. The meal was weighed and then mixed with water before feeding. But a small quantity was fed at once; as soon as this was eaten, a fresh supply was placed in the trough. From four to six feeds were given each day; the meal being carefully weighed each time, and a record made of the amount, on the spot.

The pigs were weighed separately after the third week; each one being designated by a number. Pigs No's 1, 2 and 3 were in pen A, and pigs No's 4, 5 and 6 were in pen B. The seventh week of the experiment, pig No. 6, in pen B, met with an accident that would probably have interfered with the progress of the experiment, and it was therefore killed. Its live weight was 30 lbs., and its dressed weight, 23 lbs.

In Table No. 1, is given the weight of the pigs at the close of each week, and the average weight for each week.

The average weight is found by adding the weight at the beginning of the week, to the weight at the close of the week, and dividing the sum by two. The weights in this and the following tables, are given in pounds and decimals of pounds.

TABLE No. 1.

WEIGHT OF PIGS AT THE CLOSE OF EACH WEEK, AND AVERAGE
WEIGHT OF EACH PEN FOR EACH WEEK.

DATE OF WEIGHING.	Week of Experiment	Weight of Pigs at the close of each Week, in lbs. and decimals.		Average weight for each Week, in lbs. and decimals.	
1888. May 26th.	Beginning of Experiment	25.0 Six Pigs.			
June 2d.	1st week, ..	46.5 Six Pigs.		35.75 Six Pigs.	
June 9th.	2d week, ..	PEN A. Pigs Nos. 1, 2 and 3.	PEN B. Pigs Nos. 4, 5 and 6.	65.25 Six Pigs.	
		43.50	49.50		
June 16th.	3d week, ...	52.50	54.00	PEN A. Pigs Nos. 1, 2 and 3.	PEN B. Pigs Nos. 4, 5 and 6.
				48.00	47.25
June 23d.	4th week, ..	1. 21.00	4. 23.50	59.50	61.75
		2. 23.00	5. 23.00		
		3. 22.50	6. 23.00		
		66.50	69.50		
June 30th.	5th week, ..	1. 24.50	4. 29.50	72.75	77.50
		2. 27.50	5. 27.50		
		3. 27.00	6. 28.50		
		79.00	85.50		

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.	Week of Experiment	Weight of Pigs at the close of each Week, in lbs. and decimals.		Average weight for each Week, in lbs. and decimals.	
		PEN A.	PEN B.	PEN A.	PEN B.
July 7th.	6th week, ..	1. 27.75	4. 32.25	94.12	99.87
		2. 31.00	5. 31.00		
		3. 31.59	6. 30.00		
		80.25	93.25		
July 14th.	7th week, ..	1. 30.00	4. 42.00	93.25	71.87
		2. 32.75	4. 42.00		
		3. 34.50	5. 38.50		
		97.25	80.50		
July 21st.	8th week, ..	1. 31.50	4. 48.50	98.87	86.50
		2. 33.25	4. 48.50		
		3. 35.75	5. 44.00		
		100.50	92.50		
July 28th.	9th week, ..	1. 31.00	4. 55.00	101.00	96.00
		2. 32.00	4. 55.00		
		3. 33.50	5. 48.50		
		101.50	103.50		
Aug. 4th.	10th week, ..	1. 31.50	4. 62.50	102.50	110.25
		2. 33.50	4. 62.50		
		3. 38.50	5. 54.50		
		103.50	117.00		
Aug. 11th.	11th week, ..	1. 32.50	4. 71.50	105.75	124.75
		2. 35.00	4. 71.50		
		3. 40.50	5. 61.00		
		108.00	132.50		

TABLE No. 1.—CONTINUED.

DATE OF WEIGHING.	Week of Experiment	Weight of Pigs at the close of each Week, in lbs. and decimals.		Average weight for each week, in lbs. and decimals.	
		PEN A.	PEN B.	PEN A.	PEN B.
Aug. 18th.	12th week.,	1. 36.00			
		2. 38.00	4. 80.00	114.50	138.25
		3. 47.00	5. 64.00		
		131.00	144.00		
Aug. 26th.	13th week.,	1. 38.50			
		2. 41.00	4. 85.50	127.25	147.50
		3. 54.00	5. 65.50		
		133.50	151.00		
Sept. 1st.	14th week.,	1. 41.50			
		2. 44.00	4. 88.00	140.50	155.00
		3. 63.00	5. 71.00		
		147.50	159.00		
Sept. 8th.	15th week.,	1. 40.50			
		2. 45.00	4. 96.50	149.25	162.75
		3. 64.50	5. 78.00		
		151.00	165.50		
Sept. 15th.	16th week.,	1. 43.00			
		2. 49.50	4. 100.50	157.00	173.25
		3. 71.50	5. 79.50		
		163.00	180.00		
Sept. 22d.	17th week.,	1. 43.50			
		2. 51.00	4. 106.50	167.50	183.75
		3. 78.50	5. 79.00		
		173.00	187.50		

TABLE No. 1.—CONTINUED.

Date of Weighing.	Week of Experiment.	Weight of Pigs at the close of each Week, in lbs. and decimals.		Average weight for each Week, in lbs. and decimals.	
		Pen A.	Pen B.	Pen A.	Pen B.
Sept. 29th.	18th week.	1. 43.00		177.50	195.75
		2. 54.00	4. 119.00		
		3. 98.00	5. 95.00		
		155.00	204.00		
Oct. 6th.	19th week.	1. 25.50		190.00	200.75
		2. 95.00	4. 125.50		
		3. 90.00	5. 90.00		
		190.50	205.50		
Oct. 13th.	20th week.	1. 53.00		204.50	221.50
		2. 60.00	4. 121.00		
		3. 101.00	5. 98.00		
		214.00	219.00		
Oct. 20th.	21st week.	1. 48.00		214.00	226.75
		2. 60.00	4. 102.00		
		3. 106.00	5. 98.00		
		214.00	200.00		
Oct. 27th.	22d week.	1. 50.00		219.00	233.50
		2. 68.00	4. 125.00		
		3. 111.00	5. 102.00		
		229.00	227.00		
Nov. 3d.	23d week.	1. 50.00		226.25	242.50
		2. 68.00	4. 141.00		
		3. 115.00	5. 100.00		
		233.00	241.00		

TABLE No. 1.—CONTINUED.

DATE OF WISCONSIN.	Week of Experiment	Weight of Pigs at the close of each Week, in lbs. and decimals.		Average weight for each Week, in lbs. and decimals.	
		PEN A.	PEN B.	PEN A.	PEN B.
Nov. 16th.	24th week,.	1. 52.00			
		2. 64.00	4. 145.50		
		3. 120.50	5. 118.50	222.50	257.50
		236.50	267.00		
Nov. 17th.	25th week,.	1. 54.00			
		2. 65.50	4. 150.50		
		3. 123.00	5. 124.00	269.00	276.75
		241.50	274.50		
Nov. 24th.	26th week,.	1. 56.00			
		2. 66.50	4. 153.00		
		3. 125.00	5. 129.50	244.50	275.50
		247.50	282.50		
Dec. 1st.	27th week,.	1. 57.50			
		2. 67.50	4. 154.50		
		3. 130.00	5. 126.00	251.25	285.50
		255.00	290.50		
Dec. 8th.	28th week,.	1. 59.00			
		2. 69.00	4. 156.00		
		3. 133.00	5. 142.00	256.00	292.25
		261.00	298.00		
Dec. 15th.	29th week,.	1. 60.50			
		2. 70.50	4. 156.00		
		3. 135.50	5. 145.50	263.75	299.75
		266.50	301.50		

In Table No. 2 is given the amount of feed consumed in each pen for each week, the gain per cent. in each pen for each week, and the average gain per cent. in both pens. The gain per cent. is found by proportion, from the weight given in Table No. 1. For example, the weight of the pigs in Pen A, at the beginning of the third week, is 43.50 (the weight given at the close of the 2d week). The gain for the week is nine pounds.

$$\begin{array}{rcl}
 43.50: 100:: 9 & : & \text{To the gain per cent.} \\
 & 100 & \\
 \hline
 & 43.5)900 & (20.689 \\
 & 870 & \\
 \hline
 & 3000 & \\
 & 2610 & \\
 \hline
 & 3900 & \\
 & 3480 & \\
 \hline
 & 4200 & \\
 & 3915 & \\
 \hline
 & 285 &
 \end{array}$$

The gain per cent. the third week is therefore 20.69 lbs., as shown in Table No. 2.

TABLE No. 2.

AMOUNT OF FEED CONSUMED IN EACH PEN FOR EACH WEEK, AND
GAIN PER CENT. FOR EACH WEEK.

FEED CONSUMED EACH WEEK.					GAIN PER CENT. FOR EACH WEEK.		
	PEN A.		PEN B.		PEN A.	PEN B.	Average.
	Milk.	Corn, Meal, etc.	Milk.	Corn, Meal, etc.			
1st week, ..	140.50 lbs. Milk.				.....	.....	86.60
2d week, ..	238.75 lbs. Milk.				.....	.....	80.66
3d week, ...	133.50	.....	143.25	.....	20.69	33.33	26.79
4th week, ..	144.00	Oats, 1.00	167.50	Oats, 1.00	26.66	28.70	27.70
5th week, ..	126.50	Oats, 1.50	173.25	Oats, 1.25	18.80	23.02	20.96
6th week, ..	96.25	Corn, 0.875	104.75	Corn, 1.00	12.97	9.06	10.94
7th week, ..	84.75	Corn Meal, 3.125	95.75	Corn Meal, 6.50	8.96	27.27	16.66
8th week, ..	64.00	5.25	89.25	16.50	3.34	14.91	8.63
9th week, ..	.....	13.50	.....	37.00	1.00	11.89	6.23
10th week, ..	.....	20.50	.....	43.00	1.97	13.04	7.66
11th week, ..	.....	25.00	.....	58.00	4.35	13.25	9.07
12th week, ..	.....	37.00	.....	52.50	12.04	8.63	10.19
13th week, ..	.....	45.00	.....	41.00	13.33	4.86	7.86
14th week, ..	.....	47.00	.....	25.00	10.49	5.30	7.74
15th week, ..	.....	23.00	.....	44.00	2.37	4.73	3.59

TABLE No. 2—CONTINUED.

FEED CONSUMED EACH WEEK.					GAIN PER CWT. FOR EACH WEEK.		
	PEN A.		PEN B.		PEN A.	PEN B.	Average.
	Milk.	Corn, Meal, etc.	Milk.	Corn, Meal, etc.			
16th week,		40.00	.....	36.00	7.94	8.11	8.03
17th week,		40.00	.....	46.00	5.53	4.17	4.81
18th week,		48.00	.....	55.00	6.40	8.80	7.05
19th week,		51.00	.....	53.80	6.56	5.64	6.07
20th week,		54.00	.....	48.50	9.74	5.57	7.55
21st week,		49.00	.....	39.50	No gain.	1.10	0.57
22d week,		48.50	.....	43.50	4.67	3.04	3.82
23d week,		47.00	.....	57.00	2.01	4.64	3.38
24th week,		55.50	.....	64.00	3.50	7.06	5.07
25th week,	Rorts, 9.50	40.00	.....	48.50	2.11	2.81	2.48
26th week,	15.00	41.50	.....	42.00	2.48	2.91	2.71
27th week,	17.50	46.50	.....	46.00	3.03	2.83	2.92
28th week,	17.50	42.00	.....	46.00	2.35	2.58	2.47
29th week,	15.00	44.00	.....	41.00	2.11	1.17	1.61

At the close of the experiment, December 15th, pigs No. 3, 4 and 5, were killed. The live weight, the dressed weight, and the shrinkage of each, was found to be as follows:

	Pig No. 3.	Pig No. 4.	Pig No. 5.
Live weight,.....	135.50	156.00	145.50
Dressed weight,.....	112.50	132.50	123.00
Shrinkage,.....	23.00	23.50	22.50

Pigs Nos. 1 and 2 were not killed, as they were only in fair store condition.

The following measurements, taken on the morning of the 15th, will show that they had made a fair growth of carcass, without fattening:

	Pig No. 1.	Pig No. 2.	Pig No. 3.	Pig No. 4.	Pig No. 5.
Length,.....	2 ft. 6 inch.	2 ft. 8 inch.	2 ft. 11 inch.	3 ft. 9 inch.	3 ft. 3 inch.
Height,.....	1 ft. 4½ "	1 ft. 8 "	1 ft. 8½ "	1 ft. 6 "	1 ft. 5½ "
Girth,.....	2 ft. 4 "	2 ft. 7 "	3 ft. 6½ "	3 ft. 8 "	3 ft. 5½ "

In Table No. 3, is given the amount of feed consumed per week for each 100 lbs. of live weight, and the amount of feed required to produce one pound of increase of live weight for each week. In the remarks on Table No. 4, in the report on sheep feeding, the method of obtaining the amount of feed consumed for each 100 lbs. of live weight, is fully explained.

The amount of feed required to produce one pound of increase per week in each pen, is obtained by dividing the feed consumed each week, by the gain in live weight for each week. The average amount of feed required to produce one pound of increase for each week, is obtained by dividing the amount of feed consumed in both pens for the week by the gain in both pens for the week.

TABLE No. 3.

FEEB CONSUMED PER WEEK FOR EACH ONE HUNDRED LBS. OF LIVE WEIGHT, AND AMOUNT OF FEED REQUIRED TO PRODUCE ONE LB. OF INCREASE FOR EACH WEEK.

NO. OF WEEK.	FEED CONSUMED PER WEEK FOR EACH 100 LBS. OF LIVE WEIGHT.		FEED REQUIRED TO PRODUCE ONE LB. OF INCREASE FOR EACH WEEK.		
	Pen A.	Pen B.	Average.		
1st week,.....	Milk, 303.01				Milk, 6.54
2d week,.....	Milk, 442.83				7.70
3d week,.....	Pen A.	Pen B.			
	Milk, 276.13	Milk, 813.12	Milk, 14.83	Milk, 10.96	12.52
4th week,.....	Milk, 242.02	Milk, 271.26	Milk, 10.29	Milk, 10.82	Milk, 10.56
	Oats, 1.08	Oats, 1.62	Oats, .07	Oats, .06	Oats, .07
5th week,.....	Milk, 178.88	Milk, 280.00	Milk, 10.12	Milk, 11.14	Milk, 10.05
	Oats, 2.06	Oats, 1.61	Oats, 0.12	Oats, 0.08	Oats, 0.10
6th week,.....	Milk, 114.43	Milk, 117.21	Milk, 9.89	Milk, 13.52	Milk, 11.17
	Corn, 1.04	Corn, 1.13	Corn, .09	Corn, 0.13	Corn, 0.10

7th week,.....	Milk, 90.88 Corn Meal, 3.55	Milk, 133.22 Corn Meal, 9.04	Milk, 10.59 Corn Meal, 0.39	Milk, 6.55 Corn Meal, 0.38	Milk, 7.15 Corn Meal, 0.38
8th week,.....	Milk, 94.73 Corn Meal, 5.31	Milk, 103.18 Corn Meal, 19.07	Milk, 19.09 Corn Meal, 1.62	Milk, 7.44 Corn Meal, 1.38	Milk, 10.05 Corn Meal, 1.48
9th week,.....	Corn Meal, 13.37	Corn Meal, 37.76	Corn Meal, 13.50	Corn Meal, 3.36	Corn Meal, 4.21
10th week,.....	27.00	43.51	10.25	3.55	4.42
11th week,.....	28.61	46.49	5.56	3.74	4.15
12th week,.....	32.31	38.62	2.85	4.65	3.69
13th week,.....	35.36	27.79	3.60	5.86	4.41
14th week,.....	33.45	16.18	3.86	3.13	3.27
15th week,.....	22.11	27.03	9.43	5.87	7.00
16th week,.....	25.47	20.78	3.33	2.67	2.98
17th week,.....	23.88	25.03	4.44	6.13	5.21

TABLE NO. 3.—CONTINUED.

NO. OF WEEK.	FEED CONSUMED PER WEEK FOR EACH 100 LBS. OF LIVE WEIGHT.		FEED REQUIRED TO PRODUCE ONE LB. OF INCREASE FOR EACH WEEK.		
	Pen A.	Pen B.	Pen A.	Pen B.	Average.
18th week,.....	27.04	29.63	4.36	3.52	3.85
19th week,.....	26.86	26.27	4.26	4.01	4.13
20th week,.....	26.41	19.64	2.84	3.63	3.16
21st week,.....	22.80	17.27	No gain.	19.80	.....
22d week,.....	22.15	19.92	4.85	6.64	5.89
23d week,.....	20.77	23.51	10.44	5.78	6.71
24th week,.....	23.91	24.83	6.94	3.37	4.43
25th week,.....	Meal, 16.73 Roots, 3.97	17.91	Meal, 8.00 Roots, 1.90	6.47	Meal, 7.08 Roots, .76

26th week,.....	Meal, 16.97 Roots, 6.13	15.08	Meal, 6.92 Roots, 2.50	5.25	Meal, 5.95 Roots, 1.07
27th week,.....	Meal, 14.53 Roots, 6.96	17.10	Meal, 6.20 Roots, 2.33	6.13	Meal, 6.16 Roots, 1.13
28th week,.....	Meal, 16.23 Roots, 6.73	15.74	Meal, 7.00 Roots, 2.92	6.13	Meal, 6.51 Roots, 1.50
29th week,.....	Meal, 12.67 Roots, 5.69	13.68	Meal, 8.00 Roots, 2.75	11.71	Meal, 9.44 Roots, 1.67

An examination of Table No. 1, will show that pigs Nos. 1 and 2 did not make as rapid increase in weight as the others. The change of feed from milk to meal, so far as these pigs were concerned, seemed to check the tendency to lay on fat, and they afterwards made their increase in live weight, in bone and muscle.

From this peculiarity in the growth of these pigs, and the observed variations in both pens of the amount of feed required to make a pound of increase per week, it was thought desirable to ascertain the amount of feed consumed by each individual, and the return obtained for it in increase of live weight. At the beginning of the 21st week each pig was accordingly placed in a pen by itself, and a separate weighing of the feed was made during the remaining nine weeks of the experiment. For the sake of uniformity in the preceding tables, the results of the last nine weeks are given for Pens A and B, as if a separation of the pigs had not been made.

In the following tables (Nos. 4, 5, 6 and 7,) will be found the amount of feed consumed, the gain per week, the amount of feed consumed for each 100 lbs. of live weight, and the amount of feed required to produce one pound of increase for each pig, for each week, from the 21st to the 29th, inclusive. The effects of the change were shown, as had been anticipated, in a diminished consumption of food, and a decided increase in the amount of feed to produce a pound of gain, during the 21st week.

After becoming accustomed to their new quarters, pigs Nos. 3, 4 and 5, seemed to feed well, and the increase per week was as uniform as could be expected. Pigs Nos. 1 and 2 had been very restless for several weeks before the change in pens was made, and their behavior afterwards was not in the least improved, until a ration of roots was added to their feed the 25th week.

TABLE No. 4.

AMOUNT OF FEED CONSUMED BY EACH PIG FOR EACH WEEK, FROM
THE TWENTY-FIRST TO THE TWENTY-NINTH, INCLUSIVE.

WEEK.	Pig No. 1.		Pig No. 2.		Pig No. 3.	Pig No. 4.	Pig No. 5.
	Meal.		Meal.		Meal.	Meal.	Meal.
21st,.....	11.03		12.50		25.50	23.00	16.50
22d,.....	12.00		14.50		22.00	22.50	24.00
23d,.....	11.50		11.00		24.50	23.00	29.00
24th,.....	14.00		13.50		28.00	31.00	33.00
	Meal.	Roots.	Meal.	Roots.			
25th,.....	9.00	6.00	9.00	3.50	22.00	20.50	23.00
26th,.....	10.00	10.00	9.50	5.00	22.00	17.00	25.00
27th,.....	12.00	10.50	10.50	7.00	24.00	21.00	23.00
28th,.....	11.00	10.50	11.00	7.00	20.00	18.00	23.00
29th,.....	12.50	8.00	13.00	7.00	18.50	15.00	20.00

TABLE No. 5.

INCREASE PER WEEK OF PIGS IN EACH PEN.

WEEK.	Pig No. 1.	Pig No. 2.	Pig No. 3.	Pig No. 4.	Pig No. 5.
21st,.....	Loss 5.00	No gain.	5.00	1.00	1.50
22d,.....	2.00	3.00	5.00	3.00	4.00
23d,.....	No gain.	No gain.	4.50	6.50	4.50
24th,.....	2.00	1.00	5.00	7.00	12.00
25th,.....	2.00	1.50	1.50	2.00	5.50
26th,.....	2.00	1.00	3.00	2.50	5.50
27th,.....	1.50	1.00	5.00	1.50	5.50
28th,.....	1.50	1.50	3.00	1.50	6.00
29th,.....	1.50	1.50	2.50	No gain.	3.50

TABLE No. 6.

FEED CONSUMED FOR EACH ONE HUNDRED LBS. OF LIVE WEIGHT PER WEEK, FROM THE TWENTY-FIRST TO THE TWENTY-NINTH, INCLUSIVE.

WEEK.	PEN No. 1.		PEN No. 2.		PEN No. 3.	PEN No. 4.	PEN No. 5.
	Meal.		Meal.		Meal.	Meal.	Meal.
21st,	21.78		20.83		24.64	17.49	16.96
22d,	24.49		23.58		20.23	16.85	24.00
23d,	23.00		17.46		21.63	20.25	27.82
24th,	27.45		21.26		23.73	21.88	29.33
	Roots.	Meal.	Roots.	Meal.			
25th,	11.32	16.96	5.45	18.90	18.14	13.71	23.09
26th,	18.18	18.18	7.57	14.39	17.81	11.20	19.72
27th,	18.52	21.14	10.44	15.67	18.82	18.65	21.09
28th,	18.02	18.88	11.25	16.12	15.21	11.59	20.14
29th,	18.72	20.92	10.03	18.63	13.78	9.22	18.09
Average,	16.00	20.17	8.79	17.79	19.39	15.18	21.81

TABLE No. 7.

AMOUNT OF FEED FOR ONE POUND OF GAIN PER WEEK, FROM THE
TWENTY-FIRST TO TWENTY-NINTH WEEK, INCLUSIVE.

WEEK.	PEN No. 1.		PEN No. 2.		PEN No. 3.	PEN No. 4.	PEN No. 5.
	Meal.		Meal.		Meal.	Meal.	Meal.
21st,	Lost 5 lbs.		No gain.		5.10	23.00	11.00
22d,	6.00		4.83		4.40	7.50	6.00
23d,	No gain.		No gain.		5.44	4.31	6.44
24th,	7.00		13.50		5.80	4.43	2.75
	Roots.	Meal.	Roots.	Meal.			
25th,	8.00	4.50	2.33	6.00	14.66	10.25	5.09
26th,	5.00	5.00	5.00	9.50	7.33	6.80	4.55
27th,	7.00	8.00	7.00	10.50	4.30	14.00	5.09
28th,	7.00	7.33	4.66	7.33	6.66	12.00	4.67
29th,	5.33	8.33	4.63	8.66	7.40	No gain.	7.43
Average,	5.29	8.24	4.54	9.95	5.99	7.84	4.85

A comparison of these tables with the results given for each pen in Table No. 3, will explain some of the variations from week to week, that would otherwise appear anomalous. For instance, in Table No. 3 the amount of food required to produce a pound of increase in Pen A, is 4.85 lbs. for the 22d week, 10.44 lbs. for the 23d, and 6.94 lbs. for the 24th week. Table No. 5 shows that Pig No. 1 gained 2 lbs. the 22d week, nothing the 23d week, and 2 lbs. the 24th week. Pig No. 2 gained 3 lbs. the 22d week, nothing the 23d week, and 1 lb. the 24th week. Pig No. 3 gained 5 lbs. the 22d week, 4.50 lbs. the 23d week, and 5 lbs. the 24th week.

Table No. 7 shows that Pig No. 3 made 1 lb. of increase from 4.40 lbs. of meal the 22d week, from 5.44 lbs. of meal the 23d week, and from 5.60 lbs. of meal the 24th week.

From this it is seen that the unusual amount of feed required to produce a pound of increase in Pen A, the 23d week, as recorded in Table No. 3, is caused by the irregular growth of Pigs Nos. 1 and 2.

The following Table No. 8, shows the return in increase of live weight for the meal consumed in Pen B, for five periods of four weeks each, beginning with the 9th week, and ending with the 28th week. The 29th week is not included, as it was thought best to make the periods of uniform length.

The derangement of the digestive organs of the pigs in Pen A, produced by the change of feed from milk to meal, as already noticed, would of course prevent any satisfactory comparison of results for the different periods, and they have accordingly been omitted from the table. From the 5th to the 8th week, inclusive, the feed in both pens consisted of milk and meal, in varying proportions, so that the results of the feeding during this period, cannot well be compared with the periods in which the feed was limited to a single article of diet.

TABLE No. 8.

TOTAL INCREASE, TOTAL FEED CONSUMED, FEED CONSUMED FOR EACH ONE HUNDRED LBS. OF LIVE WEIGHT, FEED REQUIRED TO PRODUCE ONE LB. OF INCREASE, AND THE GAIN PER CENT. IN PEN B, IN PERIODS OF FOUR WEEKS, FROM THE NINTH TO TWENTY-EIGHTH, INCLUSIVE.

PERIODS.	Total increase.	Total meal consumed.	Meal consumed for each 100 lbs. of live weight, per week.	Meal required to produce 1 pound of increase.	Average gain per cent. per week.	Average weight for each period.
1st PERIOD. 9th, 10th, 11th, 12th weeks.	51.50	196.50	41.54	3.81	11.71	118.25
2d PERIOD. 13th, 14th, 15th, 16th weeks.	36.00	146.00	22.53	4.06	5.75	162.00
3d PERIOD. 17th, 18th, 19th, 20th weeks.	47.50	300.50	24.60	4.22	6.04	203.75
4th PERIOD. 21st, 22d, 23d, 24th weeks.	39.50	307.00	20.93	5.24	4.11	247.25
5th PERIOD. 25th, 26th, 27th, 28th weeks.	31.00	185.50	16.41	5.98	2.90	282.50
Result for total period of 20 weeks.	205.50	935.50	23.96	4.65	6.10	195.25

The third column shows a marked decrease in the amount of feed consumed for each 100 lbs. of live weight, as the pigs approach maturity. Under favorable circumstances the decrease in consumption for each period, should be uniformly shown throughout the experiment. It will be seen that the total amount of feed consumed the second period, is over fifty pounds less than was consumed in either the first or third periods. The amount of feed consumed for each 100 lbs. of live weight, during the 2d period, as shown in the table, is therefore probably lower than it would be, with an average consumption of food for the period.

An examination of Table No. 1 will show that Pig No. 5 lost weight the 17th week, so that the amount of feed consumed for each 100 lbs. of live weight, for the 3d period, as given in the table, is probably higher than it would be, with a uniform rate of increase. The fourth column of Table No. 8, shows a rapid increase in the amount of feed required to produce a pound of live weight, as the pigs improve in condition. The average amount of meal required to produce a pound of increase in live weight, is 4.55 lbs., for the whole period of twenty weeks; but 3.61 lbs. of meal is required to produce a pound of increase during the 1st period, while in the 5th period 5.98 lbs. of meal is required to produce the same result.

During the first four weeks of the experiments, the milk consumed for each 100 lbs. of live weight, diminishes rapidly as the pigs increase in size, while the milk required to produce a pound of increase as constantly increases.

In the following tables, (Nos. 9 and 10,) are given the amount of milk consumed per week, for each pound of live weight, and the amount of milk required to produce a pound of increase per week, for the first four weeks of the experiment.

The results of the experiments in pig feeding in 1866, (Report of the Secretary of Michigan State Board of Agriculture, pp. 59 to 62,) are likewise included in the tables, for convenience of comparison. The average results of the two experiments are also given.

TABLE No. 9.

	1st WEEK.	2d WEEK.	3d WEEK.	4th WEEK.	AVERAGE FOR FOUR WEEKS.
	Average am't of Milk consumed for each 1 lb. of live weight of animal.	Average am't of Milk consumed for each 1 lb. of live weight of animal.	Average am't of Milk consumed for each 1 lb. of live weight of animal.	Average am't of Milk consumed for each 1 lb. of live weight of animal.	Average am't of Milk consumed for each 1 lb. of live weight of animal.
	Gain, per cent.	Gain, per cent.	Gain, per cent.	Gain, per cent.	Gain, per cent.
1866. (3 Pigs.)	1.96 75.86	3.33 52.92	2.92 28.20	2.49 28.00	2.96 46.28
1868. (6 Pigs.)	3.98 66.00	4.42 60.65	2.96 26.79	2.67 27.70	3.17 55.28
Average of two experiments.	3.94 80.93	3.67 66.78	2.93 27.49	2.45 27.85	3.07 50.70

TABLE No. 10.

AVERAGE AMOUNT OF MILK CONSUMED FOR ONE POUND OF INCREASE.

	1ST WEEK.	2D WEEK.	3D WEEK.	4TH WEEK.	AVERAGE FOR 4 WEEKS.
1866, (Three Pigs,).....	7.20	7.92	11.81	10.18	9.25
1868, (Six Pigs,).....	6.54	7.70	12.52	10.53	9.21
Average of two Experi- ments.	6.76	7.75	12.28	10.42	9.23

In addition to the milk consumed the 4th week, in the experiment of 1868, one pound of oats was fed in the course of the week. As this extra feed was not sufficient to materially change the results, it was not taken into account in making the tables.

The similarity of the results in these experiments is very striking. Some exceptional variations, however, require an explanation that is readily suggested, by reference to the history of the experiments. It will be seen that more milk was consumed, on the average, for each pound of live weight, during the 2d, 3d and 4th weeks of the experiment of 1868, than in the same periods in the experiment of 1866, while during the first week, a larger amount was consumed in the experiment of 1866. This variation is undoubtedly owing to the mode of feeding practiced in the different experiments during the first week. In 1866 the pigs were fed from a can furnished with a "rubber nipple," which was apparently a satisfactory arrangement, so far as the pigs were concerned. In 1868, the pigs were fed from a trough during the first week, and as they were just learning to drink, they probably did not consume as much in proportion to their live weight as they otherwise would have done.

Had the same method of feeding been adopted in 1868 that was practiced in 1866, I have no doubt that the quantity of milk consumed for each pound of live weight during the first week, would have been greater than it was during the second week, as shown in table No. 9.

It will be observed that the amount of milk required to produce a pound of live weight, in each of the experiments, is greater during the 3d week than it is during the 4th week. This exceptional result is easily explained in both cases. In 1866, a "derangement of the digestive organs was observed during this week, as shown in a tendency to constipation," a larger amount of feed was thus required to produce a pound of increase, than would otherwise have been necessary. In

1868, the pigs were all together until the 3d week, when they were divided into two lots, each of which were placed in a separate pen. This change made them restless for several days, and prevented an average return for the feed consumed.

The importance of early maturity in animals raised for the production of meat, is clearly shown in this series of experiments.

In the manufacture of pork, the best return for the feed consumed, will undoubtedly be obtained by liberal feeding during the early stages of growth, and we cannot reasonably avoid the conclusion that the same rule is applicable to all animals raised for the purposes of the butcher.

As animals are employed to convert the vegetable products of the farm into animal products of greater value, the greatest profit in fattening may reasonably be expected from liberal feeding during the period of growth, in which the organs of nutrition are capable of converting the largest amount of materials into animal tissues in a given time.

A temporary building, with fifteen pens has been made, for the purpose of continuing the experiments in pig-feeding, on a larger scale. In the spring, as soon as pigs can be obtained for the purpose, it is proposed to make a trial of three distinct breeds, viz: the Essex, the Suffolk, and the Chester White.

Five pigs of each breed will be placed in separate pens, at the age of three or four weeks, and furnished with the same kind of feed throughout the experiment. An equal number of animals of each breed will likewise be kept until they are about a year old, when they will be placed in the pens for fattening, so that the return obtained for the feed consumed at different ages, may be determined.

M. MILES.

EXPERIMENTS IN THE APPLICATION OF MANURES.

Two acres near the north end of field No. 2, were selected for the purpose of ascertaining the effect of different modes of applying manures. The soil is a friable loam, of apparently uniform character, resting upon a stratum of heavy clay. For several years the field had been used as meadow; the herbage consisting of a mixture of clover, timothy and blue grass. The clover had nearly disappeared during the past season.

Ten pieces were staked off two rods in width and sixteen rods in length. Each piece was designated by a letter, and subdivided into four equal plats, each of which was distinguished by a figure following the letter, as shown in the accompanying plan of the experiment.

In an experiment with manures applied at different seasons of the year, there is danger of fallacy from the varying character of the manures applied to the different plats. As the feed consumed in the bull stables is quite uniform throughout the year, consisting of clover and timothy hay, with a moderate ration of grain, the manure in this experiment was all taken from the "bull yard," and as fermentation had not taken place, it was probably of as uniform quality as could well be obtained.

On the sixth day of December, 1867, six loads of manure containing about 41 cubic feet each, were hauled to each of the pieces marked G and C, and spread evenly over the surface. On the 21st day of April, 1868, six loads of manure were hauled to the piece marked E, and spread in the same

manner as on the plats G and C. The land was all ploughed from the 5th to the 7th of May. The ploughing should have been done in one day, in order to secure uniformity in the condition of the surface, but this part of our plan was interfered with by circumstances beyond our control.

In all subsequent operations of fitting the ground for planting, and in cultivating and hoeing, the same amount of labor was expended on each piece the same day. After ploughing, six loads of manure were spread on each of the pieces marked A and I, on the 9th of May. The entire surface was harrowed May 13th. On the 21st of May, yellow dent corn was planted on all the pieces alike, in drills running north and south, four feet apart. A cultivator was run twice in a row on the 16th of June, and it was all hand-hoed on the 17th. July 8th it was again cultivated and hoed, and on the 21st of September it was cut up and put in "stooks."

The corn was husked and weighed, on plats No's 2, 3 and 4, of each letter, on the 22d of October. The corn on plats No. 1, of each letter, was husked and weighed October 23d. The stalks were all hauled and weighed on the 27th of October. The weather was favorable during the time of husking and hauling, so that the crop was secured in good condition.

On the following plan of the experiment, the weight of the corn in the ear, and the weight of the stalks, in pounds and decimals, is marked on each plat. For convenience of reference, a letter, indicating the time of applying the manure, is prefixed to the letter and number designating the plat.

Plats marked N, were not manured.

"	"	X, were manured Dec. 6th, before ploughing.
"	"	Y, were manured April 21st, before ploughing.
"	"	Z, were manured May 9th, on the surface, after ploughing.

EAST.

PLAN OF THE EXPERIMENT

NORTH.

TWO ROWS.

N. K. 1. Corn. 191.50 191.50 Stalks. 200.	Z. I. 1. Corn. 217.50 217.50 Stalks. 284.	N. H. 1. Corn. 219.50 219.50 Stalks. 290.	X. G. 1. Corn. 210.50 210.50 Stalks. 210.	N. F. 1. Corn. 211.00 211.00 Stalks. 164.	Y. E. 1. Corn. 228.50 228.50 Stalks. 166.	N. D. 1. Corn. 199.00 199.00 Stalks. 128.	X. C. 1. Corn. 246.00 246.00 Stalks. 190.	N. B. 1. Corn. 206.50 206.50 Stalks. 198.	Z. A. 1. Corn. 286.50 286.50 Stalks. 246.
N. K. 2. Corn. 179.50 179.50 Stalks. 180.	Z. I. 2. Corn. 202.50 202.50 Stalks. 226.	N. H. 2. Corn. 212.50 212.50 Stalks. 200.	X. G. 2. Corn. 186.00 186.00 Stalks. 160.	N. F. 2. Corn. 182.00 182.00 Stalks. 160.	Y. E. 2. Corn. 216.50 216.50 Stalks. 174.	N. D. 2. Corn. 190.50 190.50 Stalks. 146.	X. C. 2. Corn. 284.50 284.50 Stalks. 166.	N. B. 2. Corn. 228.00 228.00 Stalks. 184.	Z. A. 2. Corn. 278.50 278.50 Stalks. 217.
N. K. 3. Corn. 189.50 189.50 Stalks. 140.	Z. I. 3. Corn. 227.50 227.50 Stalks. 224.	N. H. 3. Corn. 197.00 197.00 Stalks. 166.	X. G. 3. Corn. 213.50 213.50 Stalks. 164.	N. F. 3. Corn. 197.50 197.50 Stalks. 164.	Y. E. 3. Corn. 207.00 207.00 Stalks. 180.	N. D. 3. Corn. 201.00 201.00 Stalks. 166.	X. C. 3. Corn. 232.00 232.00 Stalks. 164.	N. B. 3. Corn. 196.00 196.00 Stalks. 164.	Z. A. 3. Corn. 245.50 245.50 Stalks. 196.
N. K. 4. Corn. 183.50 183.50 Stalks. 184.	Z. I. 4. Corn. 243.50 243.50 Stalks. 276.	N. H. 4. Corn. 213.50 213.50 Stalks. 240.	X. G. 4. Corn. 200.00 200.00 Stalks. 230.	N. F. 4. Corn. 190.50 190.50 Stalks. 204.	Y. E. 4. Corn. 212.00 212.00 Stalks. 176.	N. D. 4. Corn. 189.50 189.50 Stalks. 180.	X. C. 4. Corn. 206.50 206.50 Stalks. 176.	N. B. 4. Corn. 206.50 206.50 Stalks. 202.	Z. A. 4. Corn. 237.00 237.00 Stalks. 202.

SOUTH.

FOUR ROWS.

WEST.

In table No. 1, is given the yield per acre, of corn and stalks, for each plat. The amount of shelled corn is estimated at the rate of seventy pounds of ears for a bushel of shelled corn. The average yield per acre of the subdivisions of each piece, are also given. The corn was of fair quality, although, on the whole, it gave rather more than the usual proportion of soft ears.

TABLE No. 1.

YIELD PER ACRE.

LETTER AND NUMBER OF PLAT.	CORN.		STALKS.	
	Pounds.	Bushels of Shelled Corn at 70 lbs. each.	Pounds.	Tons.
Z, A, 1,.....	5610	80.14	4923	2.46
" 2,.....	5570	79.57	4840	2.17
" 3,.....	4910	70.14	3920	1.96
" 4,.....	4740	67.71	4040	2.02
Average,	5207	74.39	4305	2.15
N, B, 1,.....	5330	76.14	3960	1.98
" 2,.....	4560	65.14	3680	1.84
" 3,.....	3900	55.71	3080	1.54
" 4,.....	4180	59.00	4040	2.02
Average,	4480	64.00	3690	1.84
X, C, 1,.....	4900	70.00	3800	1.90
" 2,.....	4600	67.00	3120	1.56
" 3,.....	4640	66.28	3280	1.64
" 4,.....	4180	59.00	3520	1.76
Average,	4520	65.57	3430	1.71

TABLE No. 1.—CONTINUED.

LETTER AND NUMBER OF PLAT.	CORN.		STALKS.	
	Pounds.	Busbels of Shelled Corn at 70 lbs. each.	Pounds.	Tons.
N, D, 1,.....	3980	56.85	2560	1.28
" 2,.....	3810	54.48	2920	1.46
" 3,.....	4920	57.48	3320	1.66
" 4,.....	3790	54.14	3600	1.80
Average,.....	3900	55.71	3100	1.55
Y, E, 1,.....	4520	64.57	3320	1.66
" 2,	4330	61.85	3480	1.74
" 3,.....	4140	59.14	3600	1.80
" 4,.....	4240	60.57	3520	1.76
Average,.....	4307	61.53	3480	1.74
N, F, 1,.....	4220	60.28	3280	1.64
" 2,.....	3640	52.00	3030	1.50
" 3,.....	3950	56.43	3280	1.64
" 4,.....	3810	54.43	4380	2.04
Average,.....	3905	55.78	3410	1.70
X, G, 1,.....	4210	60.14	4200	2.10
" 2,.....	3700	52.85	3200	1.60
" 3,.....	4270	61.00	3280	1.64
" 4,.....	4180	59.71	4600	2.30
Average,.....	4090	58.42	3820	1.91
N, H, 1,.....	4390	62.71	4400	2.20
" 2,	4250	60.71	4000	2.00
" 3,.....	3940	56.28	3320	1.66
" 4,.....	4270	61.00	4800	2.40
Average,.....	4212	60.17	4180	2.06

TABLE No. 1.—CONTINUED.

LETTER AND NUMBER OF PLAT.	CORN.		STALKS.	
	Pounds.	Bushels of Shelled Corn at 70 lbs. each.	Pounds.	Tons.
Z, I, 1,.....	4360	62.14	5080	2.54
" 2,.....	4360	57.85	4520	2.26
" 3,.....	4560	65.00	4480	2.24
" 4,.....	4360	69.28	5520	2.76
Average,.....	4450	63.57	4900	2.45
N, K, 1,.....	3330	54.71	4000	2.00
" 2,.....	3590	51.28	3600	1.80
" 3,.....	3790	54.14	2800	1.40
" 4,.....	3670	52.43	3680	1.84
Average,.....	3720	52.14	3520	1.76

A wide range of variation will be noticed in the plats without manure, the greatest yield of corn being on Plat B. 1, which gave at the rate of 76.14 bushels of shelled corn per acre, while the least yield is on Plat K. 2, which gave at the rate of 51.28 bushels of shelled corn per acre. The greatest yield of stalks on the plats without manure, was given by Plat H. 4, at the rate of 2.40 tons per acre, while the least yield was given by Plat D. 1, at the rate of 1.28 tons per acre.

A similar variation will be noticed in comparing the manured plats. From the arrangement of the plats, as will be seen by reference to the plan of the experiment, the results of four distinct experiments are obtained. These are given separately in Table No. 2, together with the averages of the combined experiment, and the gain or loss of the manured plats, when compared with the average of the unmanured plats.

TABLE No. 2.

BUSHELS OF SHELLED CORN AND TONS OF STALKS, PER ACRE.

PLATS UNMANURED.				PLATS MANURED MAY 9TH, ON THE SURFACE AFTER PLOUGHING.				PLATS MANURED DEC. 6TH, 1897, AND PLOUGHED UNDER IN THE SPRING.				PLATS MANURED APRIL 28TH, AND PLOUGHED UNDER.			
PLAT.	Bushels of Corn.	Tons of Stalks.	PLAT.	Bushels of Corn.	Tons of Stalks.	PLAT.	Bushels of Corn.	Tons of Stalks.	PLAT.	Bushels of Corn.	Tons of Stalks.	PLAT.	Bushels of Corn.	Tons of Stalks.	
N. K. 1,	54.71	2.00	Z. I. 1.	62.14	2.54	X. G. 1.	60.14	2.10	Y. F. 1.	64.57	1.66				
N. H. 1,	62.71	2.20	Z. A. 1.	80.14	2.46	X. C. 1.	70.00	1.90							
N. F. 1,	60.28	1.64													
N. D. 1,	56.85	1.28													
N. B. 1,	76.14	1.93													
Average,	62.14	1.82		71.14	2.50		63.07	2.00		64.57	1.66				
Increase on Manured Plats,				9.00	.68		2.93	.18		2.43	-.16				

FIRST SERIES.

TABLE No. 2.—CONTINUED.

PLATS UNMANURED.				PLATS MANURED MAY 9TH ON THE SURFACE AFTER PLOUGHING.				PLATS MANURED DEC. 6TH, 1867, AND PLOUGHED UNDER IN THE SPRING.				PLATS MANURED APRIL 28TH, AND PLOUGHED UNDER.			
PLAT		Bushels of Corn.	Tons of Stalks.	PLAT.		Bushels of Corn.	Tons of Stalks.	PLAT.		Bushels of Corn.	Tons of Stalks.	PLAT.		Bushels of Corn.	Tons of Stalks.
N. B. 2,	65.14	1.84	Z. A. 2.	79.57	2.17	X. C. 2.	67.00	1.86	Y. E. 2.	61.85	1.74				
N. D. 2,	54.43	1.46	Z. I. 2.	57.85	2.26	X. G. 2.	52.85	1.60							
N. F. 2,	52.00	1.50													
N. H. 2,	60.71	2.00													
N. K. 2,	51.23	1.80													
Average,	56.71	1.73		63.71	2.23		59.93	1.88		61.85	1.74				
Increase on Manured Plats,				12.00	.69		3.23	-.14		5.14	.02				

SECOND SERIES.

THIRD SERIES.

N. B. 3,	55.71	1.54	Z. A. 3.	70.14	1.96	X. C. 3.	68.28	1.64	Y. E. 3.	59.14	1.80
N. D. 3,	57.43	1.66	Z. I. 3.	66.00	2.24	X. G. 3.	61.00	1.64			
N. F. 3,	56.43	1.64									
N. H. 3,	56.28	1.66									
N. K. 3,	54.14	1.40									
Average,	56.00	1.53		67.57	2.10		63.64	1.64		52.14	1.80
Increase on Manured Plate,											
				11.57	.52		7.64	.66		8.14	.22
N. B. 4,	59.00	2.02	Z. A. 4.	67.71	2.02	X. C. 4.	59.00	1.76	Y. E. 4.	60.57	1.76
N. D. 4,	54.14	1.80	Z. I. 4.	60.23	2.76	X. G. 4.	59.71	2.80			
N. F. 4,	54.43	2.04									
N. H. 4,	61.00	2.40									
N. K. 4,	52.43	1.84									
Average,	56.20	2.02		63.50	2.59		59.56	2.03		60.57	1.78
Increase on Manured Plate,											
				12.30	.37		3.76	.01		4.37	-.23
Av. of all the Plates, ..	57.76	1.78		63.98	2.30		62.00	1.81		61.53	1.74
Average gain over Unmanured Plate,											
				11.22	.52		4.24	.03		3.77	-.40

FOURTH SERIES.

It will be seen that the plats manured on the surface after ploughing gave the best results in each series of the experiment, and also in the average results of the entire experiment. A comparison of the plats in which the manure was ploughed under, shows that the manure applied in December gave the best results in the first and the third series, while the manure applied in April gave the best results in the second and the fourth series. The average of the four series gives a slight advantage to the December manuring.

It will not be safe to draw any general conclusions from the results above given, as the peculiarities of the season undoubtedly had a great influence in determining them. A wet spring, followed by a very severe drought during the summer, presented climatic conditions that were not favorable to comparative experiments in the application of manures. Under the most favorable circumstances, however, a comparison of results for a single season could not furnish the desired information as to the relative value of manure applied in different ways. The effect upon the crops which follow in rotation, must of course be taken into account, before the question can be fully answered.

The above report is intended simply to show the progress already made, as it is proposed to continue these experiments through the entire rotation of five years.

M. MILES.

EXPERIMENTS IN THE APPLICATION OF SPECIAL MANURES TO ROOT CROPS.

In field No. 3, eight plats were staked out in the Yellow Globe Wurzels, and forty plats in the Swede Turnips, for experiments in the application of fertilizers. The plats were two rods square, and each one was designated by a letter and number, as shown in the following diagram.

The soil was a sandy loam, containing rather more clay towards the east side, where the beets were sown. From the G plats, west, the soil was quite sandy, and the experiment with the fertilizers applied to the turnips, was repeated on plats marked H, I, K, L, M. This part of the experiment was abandoned, as the seed did not come up uniformly, and it is, for that reason, omitted from the diagram.

The soil on the different series of plats was not as uniform as could have been wished, but the repetition of the plats without fertilizers by the side of those to which the fertilizers were applied, together with a duplication of the experiment on the plats from H to M, was thought sufficient to guard against any false estimate of results arising from the variation above mentioned.

This field had been in grass for several years, until 1867, when it was planted to corn. In the spring of 1868, the field was ploughed and a top-dressing of fine, unfermented manure applied to the surface and worked in uniformly with the cultivator. To guard against any variation in the results from a difference in the quality of the manure, the series of plats, as shown by the diagram, were arranged north and south, while the manure was applied in narrow strips running east and west,

so that the series of plats indicated by each letter, received dressing of the same quality of barn-yard manure.

PLAN OF EXPERIMENT,

WITH YIELD OF ROOTS, IN POUNDS, ON EACH PLAT.

		EAST.			
		Two Rods.			
NORTH.	BEETS.	Two Rods.			
		A, 1. 452 lbs.	A, 2. 540 lbs.	A, 3. 501 lbs.	A, 4. 576 lbs.
	B, 1. 610 lbs.	B, 2. 580 lbs.	B, 3. 578 lbs.	B, 4. 938 lbs.	
	C, 1. 992 lbs.	C, 2. 1,022 lbs.	C, 3. 1,094 lbs.	C, 4. 1,072 lbs.	
	D, 1. 910 lbs.	D 2. 906 lbs.	D, 3. 896 lbs.	D, 4. 984 lbs.	
	E, 1. 860 lbs.	E, 2. 776 lbs.	E, 3. 834 lbs.	E, 4. 854 lbs.	
	F, 1. 762 lbs.	F, 2. 760 lbs.	F, 3. 782 lbs.	F, 4. 842 lbs.	
G, 1. 771 lbs.	G, 2. 832 lbs.	G, 3. 637 lbs.	G, 4. 589 lbs.		
		WEST.			
		SOUTH.			

The beets, (Yellow Globe Wurzels,) were sown in drills thirty inches apart, on the 15th day of June. On the 7th day of July, a top-dressing of salt, at the rate of 300 lbs. per acre was sowed along the drills in the plats marked A. The plats marked B, had no special fertilizer applied. Any vacancies that occurred in the drills were filled by transplanting from the same plat.

During the season, the plants on the plats to which the salt had been applied, had larger tops, of a darker green, than the plats without the salt. The results at harvesting, however, showed that the salt was of no benefit.

The turnips on the series of plats marked C, D, E, F and G, were sowed on the second of July, in drills running north and south, thirty inches apart. The variety sown was Skirving's Improved Swede—seed at the rate of 2 lbs. per acre. The seed came up uniformly, and a good stand was obtained over all the plats. On the seventh of July, special fertilizers were sowed along the drills, at the rate of 300 lbs. per acre, as follows:

Plats marked C, Berry's Super-phosphate of lime.

“ E, Baugh's “ “ “

“ G, Baugh's Chicago Blood-manure. No dressing of special manures was applied to plats marked D and F.

The plats from H to M, were sowed on the third of July.

The seed was from the same package, the same drill was used, and the sowing was done by the same person who put in the crop the preceding day, on plats from C to G. A shower of rain fell during the night of July 2d, and it was thought at the time that the soil was in better condition for seeding the last day, than it was the day before. But a small part of the seed came up, however, and the plants were not even enough to make the experiment of any value, so that this part of the trial was abandoned.

After the second leaf had made its appearance, the plants were thinned in the drill, to the distance of one foot. In the cultivation of the crop, the same amount of labor was per-

formed on each plat, each operation extending over the entire series the same day. The crop was harvested October 28th, the bulbs from each plat being separately weighed. The crop was very much injured by the severe drought of the summer.

As many of the leaves were withered from the effects of the drought, and considerable variations were presented on different parts of the same plat, they were not weighed at the close of the experiment. The results estimated by the acre for each plat, are given in tables Nos. 1 and 2.

TABLE No. 1.

TURNIPS.

LETTER AND NO. OF PLAT.	YIELD PER ACRE.		REMARKS.
	Pounds.	Bushels of 60 lbs.	
C. 1,	39,680	666.33	Section C. 1, 2, 3, 4, an application of Berry's Superphosphate, at the rate of 300 lbs. per acre.
C. 2,	40,880	681.33	
C. 3,	43,760	729.33	
C. 4,	42,880	714.66	
Average,	41,800	696.66	
D. 1,	36,400	606.66	No special Manure.
D. 2,	36,240	604.00	
D. 3,	35,840	597.33	
D. 4,	39,360	656.00	
Average,	36,960	616.00	
E. 1,	34,400	573.33	Section E. 1, 2, 3, 4, an application of Baugh's Superphosphate, at the rate of 300 lbs. per acre.
E. 2,	31,040	517.33	
E. 3,	32,960	549.33	
E. 4,	34,160	569.33	
Average,	33,140	552.33	

TABLE No. 1—CONTINUED.

LETTER AND NO. OF PLAT.	YIELD PER ACRE.		REMARKS.
	Pounds.	Bushels of 60 lbs.	
F. 1,	30,480	508.00	No special Manure.
F. 2,	30,460	508.66	
F. 3,	31,380	521.33	
F. 4,	33,720	562.00	
Average,	31,470	524.50	
G. 1,	30,840	514.00	Section G. 1, 2, 3, 4, an appli- cation of Baugh's Blood Manure, at the rate of 300 lbs. per acre.
G. 2,	34,080	568.00	
G. 3,	25,480	424.66	
G. 4,	33,560	559.33	
Average, ..	30,990	516.50	

TABLE No. 2.

BEETS.

LETTER AND NUMBER OF PLAT.	YIELD PER ACRE.		
	Pounds.	Bushels of 60 lbs.	
A. 1,	18,080	301.33	Section A. 1, 2, 3, 4, an application of Salt, at the rate of 300 lbs. per acre.
A. 2,	21,600	360.00	
A. 3,	20,400	340.00	
A. 4,	35,040	584.00	
Average,	23,780	396.33	
B. 1,	24,400	406.66	No special Manure.
B. 2,	23,300	388.66	
B. 3,	23,120	385.33	
B. 4,	37,520	625.33	
Average,	27,080	450.99	

The results for each series of the turnip experiments, in bushels per acre, are given in table No. 3, together with the average of all the series, compared with the average of the plats without special manures. The losses are indicated by the minus sign.

TABLE No. 3.

NO SPECIAL MANURE.				BERRY'S SUPERPHOSPHATE.		BAUGH'S SUPERPHOSPHATE.		BAUGH'S CHICAGO BLOOD MANURE.	
Plat.	Yield in Bushels, per acre.	Average.		Plat.	Yield in Bushels, per acre.	Plat.	Yield in Bushels, per acre.	Plat.	Yield in Bushels, per acre.
D, 1,	608.66	557.33		C, 1,	661.33	E, 1,	573.33	G, 1,	514.00
F, 1,	503.00								
Gain over average of unmanured Plats,					104.00		16.00		-43.00
D, 2,	604.00	555.33		C, 2,	631.33	E, 2,	517.33	G, 2,	563.00
F, 2,	506.66								
Gain over average of unmanured Plats,					126.10		-35.00		12.67
D, 3,	597.33	559.33		C, 3,	719.33	F, 3,	549.33	G, 3,	494.66
F, 3,	531.73								
Gain over average of unmanured Plats,					171.07		-10.00		-131.67

THIRD STRIP, SECOND STRIP, FIRST STRIP.

FOURTH PERIOD.						
D. 4,	655.00	609.00	C. 4,	714.06	E. 4,	600.33
F. 4,	663.00					619.33
Gain over average of unmanured Plots,						
				105.06		-46.67
AVERAGE OF ALL THE PLOTS.						
D. 1, 2, 3, & 4 }						
F. 1, 2, 3, & 4, }	670.25		C. 1, 2, 3, and 4,	696.06	E. 1, 2, 3, and 4,	619.50
Gain,						
				153.41		-37.92
						-43.75

An examination of the tables and the plan of the experiment, will show a uniform increase in the yield of the plats from the series marked G, to the series marked C. This is undoubtedly owing to variations in the quality of the soil in the different series of plats. The regular increase in the yield from G to C, seems to show that the special fertilizers produced no effect whatever on the growth of the crops. The extreme drought that prevailed during the early growth of the plants, is perhaps sufficient to explain this unexpected result. Had the fertilizers been distributed in the drill at the time of sowing, as they should have been, a fairer estimate of their value might have been obtained. A mistake in shipping the fertilizers caused a delay that prevented their arrival in season for their application at the proper time.

M. MILES.

EXPERIMENTS WITH INDIAN CORN, IN HILLS AND IN DRILLS.

Twenty-four plats, each two rods square, were staked out on the east side of field No. 2, as shown in the following plan, for the purpose of ascertaining the relative advantages of planting corn in hills and in drills. The plats were arranged in two series, designated by the letters M and L, with a strip of beans planted between, to facilitate the equal distribution of labor in the cultivation. The ground was ploughed May 5th, and the manure applied evenly over the surface, was worked in by the cultivator and harrow. Yellow Dent corn was planted on all the plats May 21st, in rows four feet apart. The plats were all cultivated and hoed on the 15th of June, and again on the 7th of July, the plants being thinned so as to leave the same number of stalks on each piece.

The M plats, planted in drills, were cultivated twice in each row at the time of hoeing, while the L plats, planted in hills, were cultivated once in a row each way, at the time of hoeing. In the cultivation of the crop, it was proposed to expend, as far as possible, the same amount of labor on each series of the plats.

On the 17th of September the stalks were cut up at the bottom, and secured in "stooks" in good order. The corn was husked and weighed in the plats numbered 7, 8, 9, 10, 11 and 12, in each series, on the 6th of October, and in plats numbered 1, 2, 3, 4, 5 and 6, in each series, on the 9th of October, the stalks being bound and carefully set up again in "stooks." On the 12th of October the stalks were hauled to the barn, in good condition, a separate weighing being made for each plat. The weight of corn in the ear, and for the stalks for each plat is given, in the following plan of the experiment.

PLAN OF EXPERIMENTS WITH CORN IN HILLS AND IN DRILLS, SHOWING
THE YIELD OF CORN AND STALKS FOR EACH PLAT, IN POUNDS AND
DECIMALS OF A POUND.

NORTH		
CORN IN DRILLS.	BEANS.	CORN IN HILLS.
M. 1. Corn. 134.76 Stalks. 138		L. 1. Corn. 120.28 Stalks. 160
M. 2. Corn. 117.76 Stalks. 142		L. 2. Corn. 119.76 Stalks. 144
M. 3. Corn. 120.36 Stalks. 156		L. 3. Corn. 120.28 Stalks. 144
M. 4. Corn. 138.76 Stalks. 154]		L. 4. Corn. 125.28 Stalks. 166
SOUTH		

WEST.

EAST.

TABLE—CONTINUED.

NORTH.

WEST.	CORN IN DRILLS.	BEANS.	CORN IN HILLS.	EAST.
	M 5. Corn. 122.75 Stalks. 140		L. 5. Corn, 115.75 Stalks. 140	
	M. 6. Corn. 129.25 Stalks. 154		L. 6. Corn. 116.25 Stalks. 130	
	M. 7. Corn. 145.75 Stalks. 180		L. 7. Corn. 115.75 Stalks. 150	
	M. 8. Corn. 187.75 Stalks. 152		L. 8. Corn. 108.25 Stalks. 120	
	M. 9. Corn. 140.75 Stalks. 158		L. 9. Corn. 104.75 Stalks. 100	

SOUTH.

TABLE—CONTINUED.

NORTH.

WEST.	CORN IN DRILLS.	BEANS.	CORN IN HILLS.	EAST.
	M. 10. Corn. 183.25 Stalks. 160	1	L. 10. Corn. 119.25 Stalks. 120	
	M. 11. Corn. 129.75 Stalks. 148		L. 11. Corn. 105.75 Stalks. 100	
	M. 12. Corn. 107.75 Stalks. 104		L. 12. Corn. 103.75 Stalks. 130	

SOUTH.

The north plats in each series were nearly level, the soil containing considerably more clay than the plats at the south end of the series. In comparing plats of the same number in each series, there was, apparently, no difference in the character of the soil. The quality of the corn was rather better on the plats planted in hills. In the following tables the results are given for each plat, as estimated by the acre. In the column of shelled corn, seventy pounds of ears has been estimated as equal to a bushel (of 56 lbs.) of shelled corn.

TABLE No. 1.

DRILLS.

LETTER AND NUMBER OF PLAT.	YIELD PER ACRE.			
	CORN.		STALKS.	
	Pounds.	Bushels Shelled, at 70 lbs., ears.	Pounds.	Tons.
M. 1,.....	4990	71.28	5520	2.76
M. 2,.....	4710	67.28	5680	2.84
M. 3,.....	4810	68.71	6240	3.12
M. 4,.....	5550	79.28	6160	3.08
M. 5,.....	4910	70.14	5630	2.80
M. 6,.....	5170	73.85	6160	3.08
M. 7,.....	5880	83.28	7200	3.60
M. 8,.....	5510	78.71	6080	3.04
M. 9,.....	5990	85.57	6320	3.16
M. 10,.....	5330	76.14	6400	3.20
M. 11,.....	5190	74.14	5920	2.96
M. 12,.....	4310	61.57	4160	2.08
Average,	5192	74.76	5948	2.96

TABLE No. 2.

HILLS.

LETTER AND NUMBER OF PLAT.	YIELD PER ACRE.			
	CORN.		STALKS.	
	Pounds.	Bushels Shelled, at 70 lbs., ear.	Pounds.	Tons.
L. 1,	4810	68.71	6000	2.06
L. 2,	4790	68.43	5760	2.88
L. 3,	4810	68.71	5760	2.88
L. 4,	5010	71.57	6640	2.82
L. 5,	4800	68.14	5600	2.80
L. 6,	4650	68.43	5200	2.80
L. 7,	4680	68.14	6000	3.00
L. 8,	4830	61.85	4800	2.40
L. 9,	4190	59.85	4000	2.00
L. 10,	4770	68.14	4800	2.40
L. 11,	4280	60.43	4000	2.00
L. 12,	4150	59.23	5200	2.80
Average,	4583	65.47	5312	2.65

EXPERIMENTS WITH CORN.

This series of experiments was made for the purpose of determining the relative fertility of unmanured experimental plats, with reference to obtaining a reliable standard of comparison in field experiments.

In my report on experiments for the year 1866, the variations observed in the productiveness of unmanured experimental plats, of apparently the same quality and texture of soil, were referred to as a difficulty in the way of obtaining a reliable standard of comparison by which the results of field experiments may be measured. (See Report of Secretary of Board of Agriculture, for 1866, p. 59.)

In accordance with the suggestions then made, the following experiment has been planned for the purpose of avoiding this source of error in the determination of results.

Twenty-four plats of uniform size, (two rods by four rods,) were staked off on the lawn north of the Boarding Hall, each of which is designated by a number and letter, so that the experiment can be readily divided into several parallel series. These plats occupy part of the ground under experiment in the surface application of manures in 1864-6. (See Report of Secretary of Board of Agriculture for 1866, p. 55.) The outline of the original plats is traced on the office record of the present experiment, and a careful examination of the results, shows that the fertilizers applied in 1864 have produced no perceptible effect the present season. The soil is a light sandy loam, of uniform character, so far as can be determined by its physical properties and appearance, excepting at the south-east corner of the piece.

Plats A. 4, B. 4, and parts of plats A. 3, B. 3, C. 3, and C. 4, occupying the lowest portion of the ground, have a soil considerably darker than that of the other plats. The surface of the piece is nearly level, there being but a slight descent to the south-east, towards the above mentioned plats.

With the exception already noticed it would be difficult to find a piece of ground presenting a greater uniformity in the appearance of its subdivisions. At the north side of the piece several smaller plats have been added, to fill out the triangular piece along the plank road. The following plan will show the arrangement of the plats, together with the produce of corn and of stalks on each plat. The weights are given in pounds and decimals of a pound, the corn being weighed in the ear.

PLAN OF EXPERIMENTAL GROUND N. OF BOARDING HALL.
NORTH.

PLANK ROAD.

TWO RODS.
FOUR RODS.

Corn, lbs.					
166.62					
F.					
Stalks, lbs.	Corn, lbs.	Corn, lbs.	Corn, lbs.	Corn, lbs.	Corn, lbs.
140	68.87	52.87	47.87		
	F.	F.	C.		
	Stalks, lbs.	Stalks, lbs.	Stalks, lbs.		
	66	52	50		

Corn,	Corn,	Corn,	Corn,	Corn,	Corn,
147.12	153.75	166.62	130.75	114.75	117.25
F. 1.	E. 1.	D. 1.	C. 1.	B. 1.	A. 1.
Stalks,	Stalks,	Stalks,	Stalks,	Stalks,	Stalks,
142	127	144	125	119	134

Corn,	Corn,	Corn,	Corn,	Corn,	Corn,
123.25	166.25	195.62	192.62	197.50	204.50
F. 2.	E. 2.	D. 2.	C. 2.	B. 2.	A. 2.
Stalks,	Stalks,	Stalks,	Stalks,	Stalks,	Stalks,
143	167	186	189	198	193

Corn,	Corn,	Corn,	Corn,	Corn,	Corn,
160.62	168.62	192.25	223.50	262.87	201.00
F. 3.	E. 3.	D. 3.	C. 3.	B. 3.	A. 3.
Stalks,	Stalks,	Stalks,	Stalks,	Stalks,	Stalks,
183	178	189	200	189	176

Corn,	Corn,	Corn,	Corn,	Corn,	Corn,
153.62	173.12	208.00	215.50	217.50	190.50
F. 4.	E. 4.	D. 4.	C. 4.	B. 4.	A. 4.
Stalks,	Stalks,	Stalks,	Stalks,	Stalks,	Stalks,
165	190.50	207	198	193	196

WEST.
EAST.

SOUTH.

No manure of any kind has been applied to these plats since the year 1864, as described in the report on the surface application of manures. The plats have all been treated in the same manner, the same amount of labor having been expended on each. The sod was plowed under with a flat furrow about five inches in depth, on the 8th day of May. On the 19th the surface was fitted for planting, by the use of the cultivator and harrow. Yellow Dent corn was planted in hills four feet apart each way, on the 20th. June 16th the corn was cultivated and hoed, the plants being thinned to a uniform number in each hill. On the 14th of July the corn was again cultivated, and on the 16th it was hoed. The corn made a slow growth during the first part of the season, and for a time it was thought that the crop would prove an entire failure. On the 22d of September the corn was cut up at the bottom, and put in "stooks." The plats were all husked on the 12th of October, the corn being separately weighed on each plat. The corn was of inferior quality, the severe drought interfering with the maturity of the crop. On the 15th of October the stalks were hauled, the produce of each plat being weighed by itself. In the following table (No. 1,) the yield for each plat is given per acre, together with the average of the plats having the same letter. In the second column of the table, the estimated amount of shelled corn is given, reckoning seventy pounds of ears equal to a bushel of fifty-six pounds of shelled corn.

TABLE No. 1.

EXPERIMENTAL GROUND NORTH OF BOARDING HALL.

LETTER AND NUMBER OF PLAT.	YIELD P. R ACRE.			
	CORN.		TOTAL.	
	Pounds.	Busbels Shelled, at 70 lbs. earr.	Pounds.	Tons.
A. 1,.....	2845	33.50	2680	1.24
A. 2,.....	4390	53.43	3560	1.66
A. 3,.....	4320	57.43	3520	1.76
A. 4,.....	3590	57 00	3900	1.66
Average,...	3584	51.24	3505	1.75
B. 1,.....	2295	32.78	2350	1.19
B. 2,.....	3950	56.48	3900	1.66
B. 3,.....	4057	57.96	3780	1.83
B. 4,.....	4350	62.14	3860	1.68
Average,.....	3663	52.38	3495	1.74
C,.....	1915	27.35	2900	1.09
C. 1.....	2615	37.35	2500	1.25
C. 2,.....	3852	55.03	3780	1.69
C. 3,.....	4470	68.85	4000	2.00
C. 4,.....	4310	61.57	3980	1.96
Average,.....	2432	40.03	3248	1.63
D,.....	2115	30.23	2080	1.04
D. 1,.....	3182	44.75	2880	1.44
D. 2,.....	3912	55.89	3720	1.66
D. 3,.....	3845	54.94	3780	1.69
D. 4,.....	4100	59.43	4140	2.07
Average,.....	3438	49.04	3 90	1.66

TABLE No. 1.—CONTINUED.

LETTER AND NUMBER OF PLAT.	YIELD PER ACRE.			
	CORN.		STALKS.	
	Pounds.	Bushels Shelled, at 70 lbs., ears	Pounds.	Tons.
E,.....	2735	39.07	2640	1.33
E. 1,.....	3075	43.92	2540	1.27
E. 2,.....	3325	47.60	3340	1.67
E. 3,.....	3372	48.18	3560	1.78
E. 4,.....	3462	49.46	3810	1.90
Average,.....	3194	46.65	3178	1.59
F,.....	3332	47.60	2800	1.40
F. 1,.....	2942	42.08	2840	1.42
F. 2,.....	2465	35.21	2800	1.43
F. 3,.....	3212	45.89	3660	1.83
F. 4,.....	3072	43.89	3300	1.65
Average,.....	3034	42.92	3092	1.54

The least yield, according to the table, is 27.35 bushels of shelled corn and one ton of stalks per acre, on plat C, while the greatest yield is 63.85 bushels of shelled corn, on plat C. 3, and 2.07 tons of stalks on plat D. 4. The average of all the plats is 48.17 bushels of shelled corn, and 1.65 tons of stalks per acre. From the wide range of variation of these plats, all treated in the same way, it will be seen that the results of a single field experiment in the application of manures, cannot be relied on to establish any rule of practice.

Improvements in agriculture can only be made by means of a systematic series of experiments, so conducted as to guard against all sources of fallacy, and then carefully repeated under

a variety of circumstances. Experiments like these cannot well be made by a private individual, unless he is willing to expend a fortune for the purpose, in addition to his personal supervision for a series of years. The results obtained this season in the experiment under consideration, furnish simply a starting point for the investigations that are to follow. The yield of each plat, as above recorded, will serve as a standard by which future results may be measured. One-half of the plats will receive an application of manures next season, while the other half will be cropped without the addition of fertilizers, and the results will then be recorded for a number of years.

M. MILES.

EXPERIMENTS IN AGRICULTURAL CHEMISTRY.

To the Honorable State Board of Agriculture:

I herewith submit the following Report of Experiments made for the year 1868, in the department of Agricultural Chemistry:

Early in the year I presented the following scheme for experiments in my department:

To the Honorable Board of Agriculture:

In accordance with instructions from your honorable body, I present the following plan for experiments in the department of Agricultural Chemistry, for the year 1868.

The vast deposits of muck in this State, and the great value which may be derived from it by the farmer, will justify additional experiments with this substance. The experiments heretofore performed at the College with this material, have been chiefly by composting it with animal manures. I now propose to try the effect of composting it with mineral substances. I design, therefore, to make four composts with muck, viz:

Muck and wood ashes.

Muck and leached ashes.

Muck and lime.

Muck, lime and salt.

I propose to test each of these composts on corn and meadow land, devoting one-eighth of an acre to each experiment, and in order to eliminate, as far as possible, the variations in fertility of the soil, to have an equal area of ground intervening between each experimental plat, to serve as a basis of comparison, taking the mean product of two plats without manures, as a basis of comparison for the plat included between them.

I also propose to test the effects of a mixture of wood ashes and gypsum on clover. A mixture of these substances has been found more beneficial in some parts of the country, especially near the sea coast, than either of them alone. I propose to ascertain if the same is true in this inland position. I propose, also, to test leached ashes in the same way, to ascertain from whence comes the beneficial action of wood ashes—from their soluble or insoluble elements. The vast quantities of leached ashes which go to waste in our State, will justify some experiments, to call the attention of farmers to their great value.

I wish, also, to repeat and enlarge my experiments on the effects of the volatile constituents of manures. I also propose a series of observations to ascertain the influence of the composition of soils on their temperature. Schubler, Sir H. Davy, and others, have made observations on the temperature of soils as influenced by their chemical composition, and have obtained valuable information thereby; but so far as I am aware, no one has yet made a continuous series of observations of this kind, extending through the whole season of vegetable growth. The farmer has no direct control over climate; the means by which he may affect the climate, acting but slowly and imperfectly; but the soil is much more within his control. If he is able by altering the physical and chemical properties of his soil to supply the deficiencies, or control the excesses of climate, a very interesting and hopeful field of research and inquiry is opened, both to the theoretical and the practical agriculturist.

All of which is respectfully submitted.

LANSING, January 10th, 1868.

The composts for these experiments were prepared in the month of February. One consisted of five loads of swamp muck, and two loads of leached ashes; the second, of five loads of muck and ten bushels of quick lime slaked with water, with a saturated solution of common salt; the fourth, with five loads of muck, and one load of wood ashes. The mate-

rials of each compost were carefully mixed together under shelter, and shoveled over from time to time, until sufficiently incorporated and ready for use.

EXPERIMENTS WITH CLOVER.

A piece of clover ground was selected which was a second year from seeding, having been mowed once, the year preceding. One acre was taken for experiment, and divided into portions of one-sixteenth of an acre, each. To each alternate portion, manurial substances were applied, leaving every other portion with no dressing, to show the natural fertility of the soil.

The composts, &c., were applied on the 29th of April, in quantities as shown by the following table:

No. 1. One load of compost of muck and leached ashes.

No. 2. No dressing.

No. 3. One load of compost of muck and lime slaked with water.

No. 4. No dressing.

No. 5. One load of compost of muck and lime, slaked with brine.

No. 6. No dressing.

No. 7. One load of compost of muck and ashes.

No. 8. No dressing.

No. 9. One load of muck.

No. 10. No dressing.

No. 11. One-half bushel ashes and one-eighth bushel gypsum.

No. 12. No dressing.

No. 13. One half-bushel ashes.

No. 14. No dressing.

No. 15. One-eighth bushel gypsum.

No. 16. No dressing.

July 2d the clover was mowed and put up in small cocks. July 4th, cocks turned. July 6th, cocks turned again. July 7th, the clover was shaken out in the forenoon, and drawn to

the barn in the afternoon, the product of each parcel being separately weighed on a Fairbanks' scale.

September 1st the second crop of clover was cut, but on account of unfavorable weather it could not be gathered till September 14th. The clover was very much damaged by long exposure to rain.

The product of these two cuttings, the kind of dressings employed, and the gain and loss per acre, are all exhibited in the following table:

TABLE OF RESULTS IN EXPERIMENTS ON CLOVER.

	DRESSINGS APPLIED.	1st CROP.	2d CROP.	TOTAL.	GAIN.	GAIN PER ACRE.
1	Muck and leached ashes,....	265 lbs.	149 lbs.	414 lbs.	116 lbs	1,656 lbs
2	No dressing,.....	200 "	98 "	298 "		
3	Muck and lime,.....	203 "	78 "	278 "	47 "	752 "
4	No dressing,.....	125 "	39 "	164 "		
5	Muck, lime and salt;.....	128 "	30 "	158 "	Loss, 11 "	Loss, 176 "
6	No dressing,.....	134 "	40 "	174 "		
7	Muck and ashes,.....	204 "	90 "	294 "	77 "	1,232 "
8	No dressing,.....	188 "	82 "	260 "		
9	Muck,	224 "	102 "	326 "	46 "	736 "
10	No dressing,.....	211 "	89 "	300 "		
11	Half bu. ashes, $\frac{1}{2}$ bu. gyps.,	204 "	67 "	271 "	23 "	308 "
12	No dressing,	154 "	43 "	197 "		
13	Half bushel ashes,.....	169 "	49 "	218 "	15 "	240 "
14	No dressing,.....	164 "	46 "	210 "		
15	One-eighth bushel gypsum, ..	218 "	92 "	310 "	88 "	1,408 "
16	No dressing,.....	190 "	45 "	235 "		

There was a wide diversity in the productiveness of the soil, and many of the results are surprising. Thus, ashes and gypsum together, produce less apparent influence than gypsum alone. The large yield on the piece dressed by muck and leached ashes, and the yield on the piece dressed with muck

and ashes, will attract attention. The apparent loss from the use of muck, lime and salt, will also attract attention.

EXPERIMENTS IN CORN.

The piece of ground set apart for experiments in corn, was an unfortunate selection. It is a very stiff clay, which has never been underdrained. It has lain in pasture for several years, and the large number of "cut worms" which had harbored in the old sward, nearly destroyed the corn, "cutting" it badly in the early stages of its growth.

Ground was prepared for planting after stumps had been grubbed and stones removed, by ploughing and harrowing. The corn was planted the 18th of May, in rows four feet apart. Three rows had no manure; the next three had a shovelful of the compost of muck and leached ashes applied to each hill before planting, the compost and soil being thoroughly mixed by a hoe. The next three rows had no manure; then two rows had a shovelful of muck and lime in each hill, and mixed with the soil by the hoe; then two rows with no manure; then two rows with a shovelful of compost of muck, lime and salt, mixed as before; then two rows with no manure; then two rows with a shovelful of compost of muck and ashes. The rest of the piece received no dressing, except eight hills reserved for experiment with volatile elements of manures.

The corn was cultivated and hoed twice; cut up September 29th, and husked when quite dry.

The compost employed, the number of rows and yield, are embodied in the following table. For convenience of comparison, the whole will be given on the basis of two rows to each experiment.

TABLE OF RESULTS IN EXPERIMENTS WITH CORN.

ROWS.	DRESSINGS APPLIED.	CORN, LBS.	GAIN, LBS.	GAIN PER ACRE, IN BUCKELS.
2	No manure,	126	.....	.....
2	Muck and leached ashes,	179	70	28
2	No manure,	92	.....	.....
2	Muck and lime,	148	37	15
2	No manure,	130	.....	.....
2	Muck, lime and salt,	168	28	11½
2	No manure,	180	.....	.....
2	Muck and ashes,	142	32	12¾
2	No manure,	100	.....	.....

In these experiments the relatively large gain from the use of muck and leached ashes will attract attention. The composts used in these experiments were prepared in the same proportion as those used in the experiments on clover.

The above table presents the results so clearly, that no additional explanation will be required. The results would have been much more striking, if it had not been for the ravages of the "out worm," which was far more destructive on the rows treated with compost, than on those left in their natural state.

EXPERIMENTS ON THE VOLATILE CONSTITUENTS OF MANURES.

Two series of experiments were made in respect to the volatile parts of manures; one to test the influence of these volatile portions upon the production of grain, and the other to test the relative amount of ammonia which will escape, when manure is left exposed on the surface of a soil or placed beneath the soil.

The first experiments were merely a repetition of the experiments performed two years since. Four jugs, capable of containing two gallons each, were filled three-fourths full with fresh stable manure and water. In the mouth of the jug a

perforated cork was inserted, in which was placed a curved lead pipe, through which pipe all the volatile gases and vapors must pass. The open extremity of this pipe was made to descend two inches into the soil, in the centre of a hill of corn. In this way four hills of corn were fed with the volatile exhalations arising from the decomposition of the manure contained in the four jugs, and this amount of plant food they received in addition to what the soil would yield in its natural state. In like manner four other jugs were filled with hen manure and water, but in all other respects treated in the same way as the first four jugs.

The eight hills of corn thus treated exhibited a much more vigorous growth than any other hills growing in their vicinity, the color of the leaf a much darker green, and the stalks tasseled out nearly a week before any in their neighborhood.

The four hills each fed by the volatile matters given off from a jug filled with horse manure and water, yielded six pounds thirteen ounces of corn, or at the rate of sixty-six bushels per acre, a gain of 270 per cent. over the corn that grew in the neighborhood. The four hills fed with volatile elements given off from the four jugs filled with hen manure and water, yielded seven pounds nine ounces of corn, or at the rate of 75 bushels per acre, a gain of 350 per cent.

To determine the relative amount of ammonia given off in the atmosphere by manure when buried in the soil, or left on its surface, I used six boxes twelve inches on each side, having a projecting cover to prevent entrance of rain water. These boxes were placed near each other, on good garden soil. Inside each box was an "iron-stone china" breakfast plate, raised five inches from the surface of the soil, and in each plate was placed 75 cubic centimetres of standard sulphuric acid, to unite with and retain the ammonia which might be set free in the experiment.

The first and sixth box contained no manure, these serving to determine how much ammonia the acid would naturally gather from the air or soil. Box No. 2 contained half a wheel-

barrow load of fresh horse manure, covered with four inches depth of soil. No. 3, the same amount of horse manure laid on the surface of the soil. No. 4, one inch depth of hen manure, laid on the surface of the soil. No. 5 had one inch depth of hen manure, covered with four inches depth of soil.

The boxes covering the manure, and also the plates containing the acid, were placed in position May 12th, and left undisturbed till Sept. 19th, when the contents of each plate were carefully removed, and the amount of free acid which each contained was carefully ascertained by volumetric analysis. The experiment was conducted in such a way that the whole of the standard acid would remain as free acid, unless some portion was neutralized by the ammonia present, either in the form of the minute amount always found in the atmosphere during the summer months, or the ammonia formed from the decay of manure in the boxes, and escaping into the air contained in the boxes, and as a waste product when manures are so treated. The following table exhibits the results:

NO.		PURE ACID REMAIN- ING.	ACID NEUTRALIZED BY THE AMMONIA.
1.	Box covering soil,.....	78½ c. c.	1½ c. c.
2.	Horse manure covered by four inches soil, ..	72½ c. c.	2½ c. c.
3.	Horse manure on surface soil,.....	66 c. c.	9 c. c.
4.	Hen manure on surface of soil,.....	26½ c. c.	48½ c. c.
5.	Hen manure covered four inches deep,.....	72½ c. c.	2½ c. c.
6.	Box covering soil,.....	78½ c. c.	1½ c. c.

From these experiments it appears evident that when manures, even of the highly nitrogenized varieties are buried four inches beneath the surface of the soil, the loss of ammonia during the season's growth is very small; but that when left exposed on the surface of the soil, the loss by the ammonia dissipated in the atmosphere, becomes very large. The bearing

of these facts on the question of the surface application of manure, or burying it beneath the surface, will be evident to the reader, at once.

EXPERIMENTS ON TEMPERATURES OF SOIL AS AFFECTED BY CHEMICAL CONSTITUTION.

These experimental investigations consisted of a series of observations, by means of thermometers placed in the soils, and the observations taken thrice daily, from the 1st of May to the 30th of September. The soils used were tile clay taken from the subsoil; sand, such as is used for making mortar, and freed from all foreign matter, by washing; tile clay and 12 per cent. humus; sand and 12 per cent. humus, and humus. Each kind of soil was placed in a separate box; the several boxes being separated by hollow walls to prevent the lateral communication of heat. The thermometer bulbs were buried two inches deep in each soil, and the stems projected horizontally from the side of the box, so that the temperature could readily be read from the thermometer scale. The observations were taken at 7 A. M., 2 P. M., and 9 P. M. These observations and the results, are contained in the following table:

TEMPERATURE OF SOILS FOR MAY, 1868.

DAY OF MONTH.	CLAY.			CLAY AND 12 PER CT. HUMUS.			SAND AND 12 PER CT. HUMUS.			HUMUS.			SAND.			OPEN AIR.		
	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.
1,	43	53	44	46	54	46	46	55	47	44	46	45	44	53	45	43	50	43
2,	46	60	47	46	63	52	46	65	51	48	66	50	46	60	47	46	62	45
3,	43	79	56	49	76	60	46	76	60	46	76	60	48	79	57	56	69	56
4,	53	81	60	55	78	61	52	76	60	51	79	59	54	81	61	56	85	67
5,	64	75	61	67	77	64	66	77	65	63	76	64	64	79	62	64	81	57
6,	50	57	43	55	61	53	56	60	54	54	59	53	52	59	50	44	53	47
7,	47	57	44	48	60	48	43	53	43	47	55	43	46	59	46	44	56	41
8,	38	67	51	39	67	56	40	69	57	40	66	56	38	74	53	44	61	48
9,	44	72	51	43	71	57	44	71	58	42	71	57	44	78	53	47	64	47
10,	48	78	56	45	77	61	45	76	62	45	77	60	50	83	57	52	67	50
11,	45	79	56	44	79	61	46	75	62	43	77	60	43	82	57	48	70	49
12,	49	78	57	50	74	61	49	73	62	47	73	60	47	76	58	52	74	54
13,	51	83	49	53	55	52	54	55	52	53	45	51	52	83	49	53	50	45
14,	47	61	50	49	53	51	46	51	51	43	50	50	47	81	50	46	49	47
15,	50	65	54	51	64	57	50	63	57	49	61	57	50	85	54	49	63	50

16,.....	50	66	56	66	50	61	56	61	51	64	56	61	56	68	50
17,.....	54	60	40	56	61	55	50	54	55	50	45	54	55	55	47
18,.....	43	66	47	43	66	43	67	48	43	73	40	46	55	55	43
19,.....	41	75	55	41	74	41	75	41	43	80	57	48	65	65	51
20,.....	41	81	56	44	80	44	79	43	43	83	57	47	73	73	54
21,.....	50	81	61	51	79	65	78	40	43	83	62	56	74	74	50
22,.....	54	64	56	56	64	56	64	55	54	64	57	54	66	66	54
23,.....	54	77	56	56	74	61	75	60	55	76	56	54	73	73	50
24,.....	56	80	66	56	84	66	84	66	56	88	61	56	76	76	56
25,.....	57	30	66	50	80	76	86	71	57	83	60	63	86	86	66
26,.....	61	90	66	63	83	66	86	63	63	91	66	73	84	84	60
27,.....	63	70	63	64	70	66	73	66	63	71	63	67	60	60	60
28,.....	57	87	66	56	80	69	87	70	56	87	60	63	78	78	65
29,.....	58	70	66	60	70	63	70	64	60	64	61	54	73	73	56
30,.....	53	70	63	54	71	64	70	64	55	66	66	48	63	63	54
31,.....	57	80	66	60	80	67	80	63	50	83	63	63	76	76	50
Means,.....	50.77	73.03	55.90	51.97	71.74	60.06	61.90	50.64	51.00	70.03	58.77	51.54	53.30	67.32	52.74
Average,.....	50.57			60.89			50.94			50.57			57.43		

TEMPERATURE OF SOILS FOR JUNE, 1868.

DAY OF MONTH.	CLAY.			CLAY AND 13 PER CT. HUMUR.			SAND AND 13 PER CT. HUMUR.			HUMUS.			SAND.			OPEN AIR.		
	7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.	7 A.M.	2 P.M.	9 P.M.
1,	57	57	63	59	60	65	59	60	67	59	66	67	57	58	62	58	74	54
2,	55	59	61	57	60	67	58	64	68	58	79	66	55	62	61	52	70	51
3,	54	61	56	56	62	57	57	62	57	56	63	58	54	60	55	48	58	53
4,	54	72	64	55	72	65	55	73	66	54	71	66	54	71	63	54	69	64
5,	62	73	66	63	73	66	63	74	68	62	73	69	62	74	66	67	77	68
6,	64	65	55	65	66	56	65	66	58	65	66	58	65	64	55	67	59	49
7,	53	53	61	53	52	63	55	53	60	54	52	67	56	56	59	53	68	52
8,	56	68	61	58	63	63	56	70	63	56	70	63	56	63	60	56	63	57
9,	51	73	62	53	51	66	52	52	65	52	50	65	55	52	58	53	64	50
10,	62	84	61	60	67	65	65	69	66	65	85	65	58	59	58	50	73	50
11,	50	90	63	54	91	71	54	94	73	53	99	71	53	93	65	56	78	53
12,	55	90	72	58	90	74	57	93	76	56	90	75	55	92	70	59	84	69
13,	63	94	70	65	94	73	60	96	75	64	94	74	67	99	70	74	86	65
14,	68	95	82	69	96	82	71	96	83	70	96	82	73	99	78	75	90	76
15,	68	84	72	60	83	72	70	83	73	68	83	73	67	84	69	63	86	67

16,	98	73	69	96	75	73	96	76	69	96	76	71	96	73	74	92	67		
17,	69	83	74	69	83	75	84	75	69	85	74	70	86	70	74	83	74		
18,	71	94	72	70	96	75	93	76	69	98	76	73	93	72	81	92	67		
19,	69	80	70	68	83	72	69	86	68	86	73	70	80	69	77	70	64		
20,	68	78	68	68	80	66	69	67	69	81	67	70	79	68	70	75	54		
21,	60	64	53	62	65	60	62	65	61	62	59	60	64	57	55	57	51		
22,	53	82	63	60	84	67	60	67	79	83	68	57	80	63	51	77	53		
23,	59	82	66	60	84	70	61	71	59	83	71	63	83	64	65	83	60		
24,	59	80	68	60	84	71	67	72	59	81	70	61	79	64	61	74	59		
25,	57	90	66	60	93	69	60	71	59	91	70	60	86	64	60	79	56		
26,	60	94	72	62	96	74	63	76	61	96	74	65	96	74	63	83	63		
27,	63	92	75	64	92	76	66	77	64	91	76	67	94	63	71	87	63		
28,	73	89	74	71	83	74	75	78	72	83	74	78	83	73	73	91	69		
29,	69	83	74	68	83	77	69	79	63	83	73	70	83	74	76	83	70		
30,	69	94	76	69	94	73	71	73	69	95	73	72	96	74	73	94	70		
Means,	62.47	82.90	67.00	62.67	83.63	69.77	63.83	70.03	61.90	83.37	70.01	63.03	83.97	65.67	62.93	77.57	61.43		
Average,	70.79				72.62				71.79				70.39				67.31		

TEMPERATURE OF SOILS FOR JULY, 1868.

DAY OF MONTH.	CLAY.			CLAY AND 12 PER CT. HUMUS.			SAND AND 13 PER CT. HUMUS.			HUMUS.			SAND.			OPEN AIR.		
	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.	7 A.M.	3 P.M.	9 P.M.
1,	72	80	73	72	80	76	73	84	76	73	86	76	74	91	74	82	89	70
2,	73	85	75	76	94	79	76	96	82	76	97	80	72	93	76	71	92	70
3,	74	83	78	73	90	78	74	94	80	73	96	80	74	94	76	81	97	76
4,	74	94	79	74	92	82	74	100	84	74	99	83	77	94	78	84	96	78
5,	72	94	81	78	99	84	76	102	86	74	100	84	75	94	79	74	99	76
6,	72	89	82	72	89	83	76	93	82	74	92	82	73	90	77	79	90	75
7,	75	96	79	77	98	82	78	96	84	77	97	88	80	97	78	83	93	73
8,	72	80	76	73	89	79	73	92	82	73	90	80	73	87	75	72	84	69
9,	71	86	79	71	93	82	74	102	83	71	101	81	76	102	76	79	91	70
10,	69	96	78	69	98	82	72	102	84	69	101	82	72	101	73	75	92	73
11,	73	94	81	73	98	84	75	97	85	74	98	84	77	96	80	82	93	76
12,	74	104	88	74	106	90	76	104	91	75	104	89	79	103	86	86	96	82
13,	76	106	88	76	105	89	77	106	91	76	105	89	77	105	85	84	93	80
14,	78	105	86	78	106	90	78	104	91	77	105	90	73	105	86	86	93	82
15,	77	106	88	78	106	90	78	105	87	77	103	80	76	106	83	82	95	75

15,	76	104	83	77	103	84	77	103	86	76	102	80	74	102	81	78	96	74	
17,	76	100	82	77	100	85	77	104	86	76	106	87	77	100	88	77	100	78	
18,	78	88	80	78	92	82	78	95	86	77	90	82	78	86	79	86	75	77	
19,	76	92	79	76	98	83	76	93	83	76	98	83	76	92	79	76	85	74	
20,	71	101	76	71	104	83	72	102	84	72	140	82	73	100	83	72	89	70	
21,	76	88	78	76	88	80	77	87	82	75	85	81	76	86	79	76	85	76	
22,	71	101	79	71	102	82	72	101	84	72	102	82	71	99	79	73	86	73	
23,	72	81	76	73	81	76	75	82	79	73	82	79	72	81	76	69	80	75	
24,	71	97	75	71	99	76	72	95	79	72	86	78	71	97	75	70	87	68	
25,	66	88	69	66	90	72	69	93	75	67	91	73	67	88	70	64	80	69	
26,	69	90	64	69	92	70	71	89	73	72	90	71	69	89	69	63	85	64	
27,	60	91	72	64	92	74	61	89	76	63	90	76	63	90	73	62	88	66	
28,	66	87	75	67	94	79	67	93	81	66	95	79	66	94	76	70	72	70	
29,	70	87	75	72	87	78	73	85	79	71	85	73	71	86	75	70	91	67	
30,	71	89	77	71	99	80	71	96	81	71	99	80	71	99	77	76	96	74	
31,	70	79	70	72	77	70	72	76	71	71	78	71	71	78	70	70	82	68	
Meats,	72.64	93.06	77.64	73.61	94.87	89.74	73.83	98.42	87.90	73.26	96.74	81.42	73.80	94.71	77.67	76.13	90.48	72.51	
Average,	81.75	83.07	86.72	88.47	92.07	79.71													79.71

TEMPERATURE OF SOILS FOR AUGUST, 1868.

DAY OF MONTH.	CLAY.			CLAY AND 12 PER CT. HUMUS.			SAND AND 12 PER CT. HUMUS.			HUMUS.			SAND.			OPEN AIR.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1,.....	71	92	72	71	92	73	71	92	73	71	92	74	71	91	68	72	85	74
2,.....	69	85	70	70	85	70	70	90	72	70	89	73	72	84	70	68	83	64
3,.....	60	83	68	62	83	65	63	88	69	64	81	69	64	81	65	60	75	59
4,.....	57	84	65	59	85	68	60	84	72	59	85	70	60	84	66	59	74	58
5,.....	58	85	71	60	86	73	61	88	76	60	87	75	60	86	72	61	86	66
6,.....	61	93	78	63	95	77	65	95	79	62	94	77	64	95	73	69	92	70
7,.....	69	89	80	69	90	73	71	86	74	69	86	74	70	89	70	72	86	82
8,.....	63	70	60	65	72	63	65	75	65	64	72	64	64	73	60	66	68	56
9,.....	61	71	62	62	72	65	61	72	67	61	73	66	62	73	64	61	68	53
10,.....	54	55	50	56	66	61	53	66	63	53	66	62	56	66	61	54	65	53
11,.....	61	74	61	62	74	62	62	73	64	61	72	64	61	73	61	60	70	56
12,.....	49	84	60	50	85	63	51	85	65	50	84	65	50	86	62	50	75	52
13,.....	52	83	60	53	87	65	55	86	63	53	83	66	53	87	64	60	85	59
14,.....	58	87	66	60	91	73	61	88	72	60	83	72	62	89	68	67	83	64
15,.....	59	83	60	62	90	73	62	89	73	61	89	73	61	83	70	62	83	66

14,.....	64	83	66	65	87	70	65	86	73	66	84	71	66	83	68	64	77	60
15,.....	55	96	69	60	96	71	61	96	74	60	92	73	59	92	70	57	87	69
16,.....	67	74	71	68	78	73	68	78	72	68	73	72	67	73	71	67	75	72
19,.....	66	88	69	66	89	70	66	90	73	66	90	74	66	91	71	70	90	63
20,.....	66	72	67	67	72	67	67	73	68	67	78	70	66	72	67	64	68	62
21,.....	62	87	62	63	96	67	68	98	72	62	89	70	62	88	65	53	73	52
22,.....	53	82	62	56	87	66	55	90	72	56	87	70	56	87	66	53	82	57
23,.....	57	90	68	58	92	72	60	90	74	58	89	73	53	87	69	63	86	60
24,.....	54	83	68	58	90	71	61	90	75	58	89	73	57	80	69	54	80	62
25,.....	56	93	68	66	91	71	62	89	74	59	90	73	58	88	68	58	90	60
26,.....	53	95	69	69	98	72	63	91	75	61	91	73	60	88	71	60	80	62
27,.....	66	88	71	66	89	73	67	86	75	67	86	74	66	85	72	64	90	72
28,.....	64	88	72	66	80	74	68	93	76	67	91	76	66	90	73	62	89	66
29,.....	68	94	70	70	94	71	71	90	73	70	92	73	68	90	71	74	88	62
30,.....	59	84	68	63	84	70	65	82	73	62	82	72	62	82	69	56	78	60
31,.....	63	74	66	63	74	66	63	74	67	63	73	67	68	73	66	63	73	63
Means,.....	60.61	84.85	66.80	62.35	85.43	69.19	63.29	84.93	71.55	61.69	83.74	71.52	62.32	83.63	67.80	60.90	81.06	61.58
Average,.....	67.84																	
	70.50																	
	72.32																	
	75.36																	
	75.81																	
	71.26																	
	67.84																	

TEMPERATURE OF SOILS FOR SEPTEMBER, 1868.

DAY OF MONTH.	CLAY.			CLAY AND 12 PER CT. HUMUS.			SAND AND 12 PER CT. HUMUS.			HUMUS.			SAND.			OPEN AIR.		
	1 A.M.	3 P.M.	9 P.M.	1 A.M.	3 P.M.	9 P.M.	1 A.M.	3 P.M.	9 P.M.	1 A.M.	3 P.M.	9 P.M.	1 A.M.	3 P.M.	9 P.M.	1 A.M.	3 P.M.	9 P.M.
1,	63	73	61	63	73	63	63	72	66	63	70	64	62	72	63	63	70	54
2,	56	72	64	57	72	66	53	71	67	57	70	68	57	71	64	54	70	64
3,	61	70	58	63	70	60	63	70	63	62	70	62	63	71	60	63	74	59
4,	49	68	58	50	68	60	51	70	63	50	70	63	51	70	61	51	70	58
5,	48	74	68	50	76	62	53	76	63	52	77	63	52	76	59	52	74	54
6,	60	65	63	61	65	64	62	66	64	60	65	64	60	65	65	63	69	62
7,	59	79	58	60	81	61	61	76	62	60	76	62	60	73	59	58	79	52
8,	54	66	65	56	66	67	56	65	67	55	65	67	55	66	68	56	69	67
9,	60	70	67	62	71	63	62	71	68	62	71	68	62	70	64	62	62	64
10,	65	79	62	66	81	64	65	79	64	65	80	65	65	78	62	67	84	62
11,	64	81	70	64	83	70	63	74	68	63	78	70	65	81	71	62	80	66
12,	70	78	70	69	77	70	68	76	68	68	74	71	69	76	70	70	81	70
13,	61	78	59	62	83	64	62	84	59	62	78	64	62	71	66	59	70	50
14,	49	74	56	50	78	61	52	70	57	50	76	61	53	82	64	50	73	51
15,	56	69	63	59	69	64	60	69	66	58	69	65	59	69	63	60	70	59

16,.....	47	68	46	49	66	50	49	69	53	48	67	53	48	66	50	43	56	37
17,.....	38	62	44	39	66	50	41	69	52	41	66	52	40	60	48	32	66	38
18,.....	37	62	46	39	65	50	42	70	55	41	66	52	41	62	50	32	68	42
19,.....	37	61	56	38	62	59	39	62	59	40	60	58	38	61	56	36	66	58
20,.....	56	68	47	58	70	51	58	69	53	58	66	63	57	68	49	56	66	38
21,.....	36	60	51	38	64	53	40	64	56	40	64	54	39	64	53	28	64	50
22,.....	49	61	50	48	62	52	49	62	55	49	61	55	48	61	52	46	63	48
23,.....	44	59	43	47	64	49	49	67	51	49	63	49	48	59	47	45	59	36
24,.....	44	53	46	46	55	48	47	57	49	47	55	47	46	55	48	39	52	42
25,.....	44	50	46	46	51	48	46	51	49	46	50	49	46	51	49	40	47	45
26,.....	36	57	49	38	58	51	39	60	51	40	58	51	40	58	51	32	53	50
27,.....	48	64	56	49	66	58	49	69	58	49	66	58	50	65	57	50	68	60
28,.....	45	56	42	44	53	45	44	60	49	44	58	46	44	59	44	44	66	39
29,.....	38	55	45	39	60	47	40	63	48	40	61	48	40	56	46	38	65	43
30,.....	49	54	56	50	55	61	50	56	59	49	54	61	50	56	64	52	56	51
Means,.....	50.56	66.03	55.16	52.00	67.77	57.90	52.63	67.53	58.70	52.27	66.73	58.77	52.33	66.17	56.27	49.33	67.20	51.96
Average,.....	57.25																	
	59.22																	
	59.26																	
	58.50																	
	56.14																	

RECAPITULATION.

	AVERAGE TEMPERATURE AT		
	7 A. M.	2 P. M.	9 P. M.
Of Thermometer in open air,.....	80°.29	76°.72	80°.01
Of Tile Clay from subsoil,.....	59°.39	80°.07	64°.50
Of Tile Clay and 12 Per Ct. Humus,.....	60°.52	80°.88	67°.52
Of Sand,.....	60°.56	80°.41	64°.74
Of Sand and 12 Per Ct. Humus,.....	60°.96	81°.61	69°.86
Of Humus, or Swamp Muck,.....	60°.02	79°.93	66°.00

AVERAGE DAILY TEMPERATURE OF

Thermometer in open air,.....	65°.68	Over Air.	.....
Clay,.....	67°.99	2°.31	Over Clay.
Clay and 12 Per Ct. Humus,.....	69°.57	3°.89	1°.66
Sand,.....	68°.23	2°.66	Over Sand.
Sand and 12 Per Ct. Humus,.....	70°.96	5°.28	2°.68
Humus,	69°.36	3°.67	.....

The temperature at 2 P. M. is often excessive, and those combinations of soil would seem to be best adapted to vegetable growth which maintain an elevated temperature at other portions of the day, e. g., at 7 A. M., and 9 P. M. Tried by this standard, we find that clay, mixed with 12 per cent. humus, has a temperature higher by 2°.08, than tile clay; and sand, with 12 per cent. humus, has a temperature higher by 2°.68 than pure sand, and this relative excess of temperature is maintained through the whole season of active vegetable growth, viz: from 1st of May till 1st of October.

It will appear from this, that the farmer has an indirect control over the climate of his fields, through this relation of humus to temperature of soils, when mixed with them. The popular opinion in regard to muck, is expressed in the epithet "frosty," so generally applied to it. One reason for regarding a mucky soil as predisposed to frost, probably arises from the

position it usually occupies, viz: at the bottom of valleys, and other low positions. Into these valleys the air, rendered denser from a loss of temperature, will pour from all the surrounding high lands, and hence a lake of cold air will fill each valley, and a slight reduction of temperature by radiation will result in frost, and this frost is the result of position, and does not necessarily arise from the nature of the soil in such valley. Persons who travel in an open carriage at night in summer, and when the air is still, are aware how abrupt is the passage from comparatively warm air on the highlands to the cold air filling a valley, and the equally abrupt change as they rise out of the valley into the warm air covering the opposite bank.

All of which is respectfully submitted.

R. C. KEDZIE.

LANSING, December, 1868.

EXPERIMENT WITH FIFTY-FIVE VARIETIES OF POTATOES, SHOWING THE
YIELD PER ACRE OF EACH VARIETY, IN THE SAME SOIL AND UNDER
THE SAME TREATMENT.

	NAME OF VARIETY.	Yield in Bushels to the Acre.
1	Early Rose,	191
2	" Shaw,	149½
3	" Stevens,	263
4	" Minnesota,	202
5	" Handsworth,	112
6	" Goodrich,	269
7	" Sebec,	149½
8	" Race-horse,	195½
9	" White Sprout,	241½
10	" Cottage,	140
11	" Buckeye,	184
12	" Dykeman,	251
13	" Sovereign,	161
14	Prince Albert,	262
15	Fluke,	253
16	Shakers' Fancy,	291
17	Chenery,	252
18	Delmahoy,	273
19	Jackson White,	272
20	Chill, No. 2,	265
21	Rough and Ready,	256
22	Harrison,	308
23	Titicaca,	228
24	Rochester Seedling,	190
25	Orono,	263
26	Skerry Blue,	163
27	Strawberry,	290
28	Casco,	240

EXPERIMENT WITH POTATOES—CONTINUED.

NAME OF VARIETY.		Yield in Bushels to the Acre.
29	Bulkley's Seedling,.....	227
30	Gleason,.....	186
31	Patterson's Regent,.....	229
32	" Blue,.....	270
33	Scotch Blue,.....	212
34	White Chenango,.....	186
35	Pinkeye Rustycoat,.....	256
36	Colebrook Seedling,.....	155
37	Lapstone Kidney,.....	220
38	Calico,.....	228
39	King,.....	108
40	Coppermine,	176
41	Forfarshire Red,	311
42	Callao,.....	207
43	Andee,.....	186
44	Seedling Rock,.....	197
45	Cuzco,.....	345
46	Monnas Pride,.....	64
47	Wheeler's Milky White,.....	256
48	British Queen,.....	166
49	Vanderveer's Seedling,.....	262
50	Garnet Chili,.....	216
51	Davis Seedling,.....	276
52	Prince of Wales,.....	197
53	White Peachblow,.....	250
54	White Chili,.....	220
55	Napoleon,.....	190

EXPERIMENT WITH THIRTY-SIX VARIETIES OF TOMATOES.

	QUALITIES OF THE VINE.					QUALITIES OF FRUIT.				
	EARLINESS.					Reness, i. e. general correspondence to the type of the variety.	Smoothness.	Freedom from Rot.	Solidity.	Color, (uniformity and shade.)
	Ripe fruit picked Aug. 4th.	Fruit picked between Aug. 4th and 11th.	Fruit picked between Aug. 11th and 17th.	Oz.	Lbs., Oz. Total weight picked up to Aug. 17th.					
	Oz.	Oz.	Oz.	Oz.	Lbs., Oz.	Health.	Productiveness—based upon the amount borne, whether ripened or not.	Length of time in bearing.		
Fellen's Early,	3	9	8	1.4	8	8	9	6	3	9
Early York,	26	4	12	2.10	12	8	8	4	3	4
Cluster, (Prairie Farmer),	14	38	32	5.4	32	8	8	10	3	7
Dwarf Scotch, or Orangelid D. Prolific,	18	20	8	2.11½	8	1	8	8	3	7
Powell's Early,	19	17½	35	4.7½	35	8	8	8	3	7
Cedar Hill Early,	20	40	23	6.12	23	8	8	8	3	7
Sim's Early Cluster,	6	17	12	2.3	12	8	8	8	3	7
Early Apple,	18	18	55	6.6	55	8	8	10	3	7
Early Red,	15	12	86	7.1	86	8	8	10	3	7
Keyes Early Prolific,	10	4	8	1.6	8	8	8	10	3	7
Mexican,	4	4	16	1.0	16	8	8	10	3	7
Felce,	4	4	20	1.8	20	8	8	10	3	7
Knox's Superior,	32	6	8	2.6	8	8	8	10	3	7
Collin's Improved,	8	23	8	2.7	8	8	8	10	3	7
Leater's Perfected,	15	15	13	5.7	13	8	8	10	3	7
Board's,	31	15	43	5.7	43	8	8	10	3	7

The varieties are marked on the scale of 10,—the best marked 10, the poorest marked 1, the others, intermediate.

In the experiment, 4 set in good remainder set in similar soil, but of a heavy dressing of well rotted open ground, 43 in. apart, May planted to 4 in. apart April 23d.

Fellen's Early,

Early York,

Cluster, (Prairie Farmer),

Dwarf Scotch, or Orangelid D. Prolific,

Powell's Early,

Cedar Hill Early,

Sim's Early Cluster,

Early Apple,

Early Red,

Keyes Early Prolific,

Mexican,

Felce,

Knox's Superior,

Collin's Improved,

Leater's Perfected,

Board's,

	Seeds plants ^a transplanted April 28:	Seeds plants ^b set in open ground May 10:	Seeds plants ^c set in unmanured soil.
Tilden.....	16	.....	.....
Cook's Favorite.....	16	.....	.....
Mary's Superior.....	23	.....	.....
Red Valencia Cluster.....	24	.....	.....
Large Red.....	24	.....	.....
College No. 1.....	16	.....	.....
Bairds.....	17	.....	.....
Fennell Hall Market.....	4	.....	.....
Eureka.....	20	.....	.....
Red Plum.....	.....	.....	.....
Yellow Plum.....	.....	.....	.....
Red Cherry.....	.....	.....	.....
Grape.....	.....	.....	.....
College No. 3.....	9	.....	.....
White.....	11	.....	.....
Large Yellow.....	6	.....	.....
Chinabush.....	.....	.....	.....
Tree.....	.....	.....	.....
Strawberry, (<i>Physalis alkekengi</i>).....	.....	.....	.....

* Seeds planted April 17th; transplanted April 27th; set in open ground May 20th.

CHARACTERISTICS OF THE SEASON OF 1868.

The active operations of husbandry were delayed by the low temperature of April and May. The planting of Indian corn was not completed in the central part of the State till the first of June. The ground was then, in some cases, closely packed from pretty heavy rains that fell towards the end of May, and from that cause and the cool weather, germination and the early growth of plants was very slow. The temperature of June being tolerably favorable, and the supply of moisture seasonable, the progress of vegetation was quite rapid. With July the temperature became still higher, and the growth of many things, particularly Indian corn, was very luxuriant during the first part of the month, or until rain was needed. The drought, however, became very sharp before the close of the month, and almost all crops suffered, unless growing on land specially favored as to moisture. Winter wheat and early sown spring grains, were so far advanced as to be little affected by the drought which commenced in July, but later crops were more or less injured.

Indian corn, in many instances, did not recover from the check it received, and root crops were much lessened in yield. The first crop of grass was tolerably good; meadows yielded little or no second crop, and pastures remained comparatively bare after the middle of July. A comparison of the rain-fall, in inches and fractions, from May to November, inclusive, for the years 1866, '67, and '68, as shown by the Meteorological Journal kept at the State Agricultural College by Prof. Kedzie,

will show to what extremes our seasons run in respect to moisture:

MONTHS.	1866.	1867.	1868.
May,	3.478	3.800	2.800
June,	5.366	2.828	3.546
July,	4.194	1.782	1.106
August,	3.442	1.740	2.420
September,	5.866	1.419	2.964
October,	3.566	2.106	1.106
November,	2.600	2.180	2.420
	28.452	15.866	16.371

The years 1867 and '68 were remarkable for the small quantity of rain which fell, after the month of June. Streams and wells were very low during the winter of 1866-7, occasioning much inconvenience for want of water for domestic animals and for household purposes. But the scarcity for the following winter was even greater. Wells which had long been depended on as "never failing," became exhausted, and new ones had to be dug at that inclement season, to obtain the necessary supply of water.

What may be called the "growing season" of 1868, was very short. It scarcely began till June, and on the morning of the 16th of September there was a general frost, damaging more or less, buckwheat, Indian corn, and potatoes, as well as putting a stop to the growth of squashes, melons, cucumbers, tomatoes, &c. Forward fields of Indian corn were ripe enough to cut up and shock when the frost came, and considerable had been thus secured. Most of that which was standing was injured in the fodder, and the later fields were hurt in both fodder and grain. Indeed, if the month of July had not been unusually warm, the corn crop would have been a failure. The mean temperature of this month was 77.20, the average of the last five years being 71.91.

Potatoes were, in many instances, quite green in the tops, when the frost of the middle of September occurred. Where the tops were not killed, the tubers grew considerably during the several days of mild weather which succeeded the frost, and the yield of the crop was fair—better than was expected considering the unfavorableness of the season.

The autumn was too dry for the ready preparation of ground for winter wheat. Still, a fair breadth was got in. That which was sown early, on fallow ground, properly tilled, made a fair growth before the ground froze. In other cases the growth was feeble, and the plants made but a small show at the setting in of winter. It will be remembered, however, that the crop of 1868 was sown, and met the winter under still more unfavorable circumstances, and yet turned out the best yield, on an average, that has been obtained in the State for several years.

YIELD OF CROPS.

In November, circulars comprising blank tables, were sent, by the Secretary of the State Board of Agriculture, to the presidents, or secretaries of the Agricultural Societies of each county in the State, with a request for returns in regard to the yield of the principal crops. Only nineteen counties, however, were heard from. A summary of their returns is presented in the following table, showing the yield, per acre:

COUNTY.	WHEAT, BUSHELS.	BARLEY, BUSHELS.	OATS, BUSHELS.	BUCK- WHEAT, BUSHELS.	INDIAN CORN, BUSHELS.	POTATOES, BUSHELS.	HAY, TONS.
Barry,	18	.....	30	20	30	60	1½
Bay,	18	.....	30	25	30	90	1½
Berrien,	20	24	40	20	40	100	2
Branch,	15	25	30	18	40	75	1½
Calhoun,	14½	25	30	20	35	115	1½
Cass,	18	.....	.....	.....	40	.....	.....
Genesee,	20	20	40	10	40	80	1½
Hillsdale,	20	23	35	15	40	70	1½
Ionia,	12	18	20	20	30	100	.....
Kalamazoo,	20	20	30	15	40	100	1½
Lapeer,	18	25	30	25	30	100	1½
Leelanaw,	18	25	33	25	28	100	1½
Macomb,	15	20	35	20	40	150	1½
Oakland,	20	25	40	.....	40	100	1
Ottawa,	16	25	20	20	50	50	1½
St. Joseph,	20	.....	40	30	25	60	1½
Tuscola,	20	.....	40	20	40	50	1½
Van Buren,	12	.....	20	8	30	75	1
Washtenaw, ...	20	25	40	.....	*80	100	1½

* It may be that these figures were intended to represent bushels of ears.—S. H.

Some information was comprised in the returns which cannot be tabulated, and is therefore submitted in the following form:

In *Barry* county, it is stated, the crops of oats, Indian corn and potatoes, were much injured by drought, and that there were but few apples. *Bay* is said to have had but a light crop of apples; peaches and pears shown at the county exhibition, were very fine. In *Berrien*, Indian corn and potatoes were injured by drought. In *Branch*, wheat is said to have made so large a growth of straw that it lodged badly; that the cold, wet spring, early frost in the fall, and dry weather in summer, did much injury to Indian corn and potatoes; that there was but a light crop of apples, attributed to the cold spring, and but few peaches; that hops yielded about 400 lbs. per acre, were injured by frost, and worth only ten cents per pound. In *Calhoun*, wheat is thought to have been lessened in yield by the midge, to the amount of about one-third; that Indian corn was much injured by drought, and that rainy weather in the earlier stages of the crop, prevented proper cultivation; that apples were only one-fourth of an ordinary yield, and peaches were mostly winter-killed; that hops yielded about 586 pounds per acre, or about half an average crop. In *Cass*, the returns state that the Indian corn crop was seriously injured by a high wind about the time of earing, and some badly-tilled pieces were hurt by drought; that apples were about one-third an average crop. In *Genesee*, the buckwheat crop was badly hurt by dry weather, though but little was sown; the crop of apples was so small as not to be worth securing; hops yielded about 400 pounds per acre, the deficiency being attributed to dry weather, and the neglect of yards in consequence of the failure of the crop of 1867; no sale for the produce of 1868. In *Hillsdale*, the crops of wheat, barley and hay, are considered "good;" oats and buckwheat injured by drought; Indian corn, a fair crop, but early frosts made considerable "soft corn;" potatoes, small and not an average yield; apples, a light crop, and the fruit small; no peaches; hops, a fair crop, but injured

by frost—worth about fifteen cents per pound. *Ionia* reports a poor apple crop; the peach crop “a failure;” the hop crop about one-third of an average, with “no sales.” For *Kalamazoo*, the reporter, Mr Frank Little, states that the hop crop was equal to about three-fourths of an average, and worth from twelve to sixteen cents per pound. Under date of Nov. 24th, he writes:

“The season, as you well know, has been a peculiar one in many respects, and especially as to the exceedingly high range of temperature during the months of June and July. I send you, enclosed, a statement of temperature for *twenty-eight* days, as kept by myself, where the thermometer indicated 90° to 99° in the shade. This is unprecedented, I think, in the experience of any one in our State; it is certainly in my own, and I have been a resident here thirty-seven years. The effect upon vegetation of such a heated term, was noticeable in a marked degree, and very much diminished the yield of wheat, which up to this time bade fair to be the largest crop we had harvested for years. Potatoes suffered exceedingly; corn was not injured as much, though much stunted and retarded in its growth; the pastures also became sere and yellow, and the supply of milk failed. The later sorts of potatoes came on after the fall rains, and the weather being favorable, we have realized a partial crop; so also of corn, and the present condition of the pastures is fully up to the average, and stock seem to be doing well. The fall-sown wheat is well rooted, and in good condition to go into the winter; and withal, the whole situation with farmers *now* is quite favorable, so far as I can judge.”

Lopeer reports apples a “fair crop,” and peaches “good;” hops also “good.” *Leelanaw* reports a “fair yield” of apples, and a “good” crop of peaches; a very dry season, with no rain to benefit vegetation from June 5th to July 29th. *Macomb* reports the hop crop at about 800 lbs. per acre, worth twelve cents per pound; no peach crop in the county for several years, *Ottawa* reports that barley and oats were injured by the

excessive heat at the time of filling; buckwheat injured by dry weather; apple crop small; peach crop "very large." *Oakland* reports the apple crop as "below the average;" the hop crop "very good"—worth fifteen cents per pound. *St. Joseph* reports that Indian corn and potatoes were much injured by hot and dry weather in July; apples, one-fourth of an average crop, the deficiency being attributed to the cold winter and spring, the apple moth, &c.; peaches, one-tenth of an average, the deficiency attributed to the cold winter; peppermint, good crop—sixteen lbs. of oil per acre, worth \$4 per lb. *Tuscola* reports potatoes much injured by drought in July and August. Orchards are young, many not yet in bearing. Apples and peaches give from five to a hundred bushels per acre. In *Van Buren* wheat is said to have made a heavy growth of straw, which lodged badly, in some instances rusted, and the grain was considerably shrunken. The hot weather is said to have been "hard" on oats and buckwheat, and in consequence of the latter not coming up at the proper time, it did not all ripen before frost came. Some pieces of Indian corn reported as "very poor." Apples and peaches reported as "good" in the western part of the county. Hops in some instances "good;" in others, "very poor," but quoted at only ten cents per pound. *Washtenaw* reports the apple crop as about one-fourth of an average crop, and peaches "very few."

REMARKS ON SOME INSECTS INJURIOUS TO VEGETATION, IN MICHIGAN.

BY A. J. COOK, PROFESSOR OF ENTOMOLOGY, IN THE MICHIGAN STATE
AGRICULTURAL COLLEGE.

The science of insects, or Entomology, technically considered, is of wondrous interest; involving so much of the beautiful and marvelous, as to win the most energetic thought and study of some of the finest minds. But it also possesses an economic importance, which is gaining, and justly too, greatly increased attention. As Dr. Harris, our country's great and honored pioneer in this direction, has suggested: A disturbing of the original balance in nature by destroying the forests and insectivorous animals, has left the insects greatly in excess of the native vegetation. They are thus led to attack fruit and grain plants, often to such an extent as to destroy entirely the hopes of the husbandman. Millions of dollars worth of property are thus annually destroyed in the United States, and we have but to mention the Hessian-Fly, and Wheat-Midge, to remind the farmers of Michigan that they sustain a generous share of the burden.

During the past year, Michigan has been very fortunate, as those great evils just mentioned have not been much among us. But we have had to entertain, with ill-grace to be sure, several insect visitors; some to enjoy a season and then leave us for years; others, doubtless, will abide with us; while others have only as yet given a foretaste of the mischief they have in store for us.

Before speaking of some of the insects that have been some-

what troublesome in our State during the past year, it will be well to say a word as to insects in general, preparatory to a better understanding of what shall follow.

All insects have three separate stages—the larva, pupa, and imago. The larva is that condition which immediately succeeds hatching, and lasts from a few days or weeks,—as in our common maggots and caterpillars,—to several years, as the larvæ which develop into our stag-beetles and seventeen-year cicada. In this state they are worm-like, wingless creatures, and generally, feed voraciously. Some are without legs, as are our common maggots; though the most possess six anterior legs, and a large number, several fleshy posterior ones. This is the season of the much dreaded destruction, with most of the orders.

In the second, or pupa stage, all beetles, butterflies, moths, bees, and all allied forms, and our common flies, are in a state of profound quiescence, seemingly without life; while others, as our locusts, or grass-hoppers and bugs, are quite like the larvæ, except that they possess stubs of wings and have increased in size, and even do more damage, as they are larger, and eat accordingly.

In the imago, or perfect state, all have six feet—an exclusive character of insects—and generally possess four wings, although one order,—Diptera, including the common house-fly, mosquitoes and gnats,—have but two, and yet a few, as lice and ticks, are without wings. A large number, as beetles, locusts and the like, have jaws which move sidewise; while bugs, and two winged insects have instead, a strong back; and butterflies and moths are furnished with a long sucking-tube. The locusts, and many beetles, are very great pests during this period: “eating every green thing from off the face of the earth,” while others, as butterflies and moths do little else than pair and deposit their eggs. Thus copying some bipeds in not being content to die, till they have prepared for a vast deal of future mischief.

In the report of 1867, quite a lengthy account was given of the Colorado potato beetle—(*Doryphora 10-lineata*) of Say. Happily for us, this merciless forager has not made its usual progress in our State, having spread but little during the past season. We expressed the opinion in the *Western Rural*, of 1867, that the settlement in the south-western corner of our State was not a full colony, but only a few stragglers, the main body having been retarded, perhaps, by the lake. This may account for the slackened speed in their eastward march. The presence of fowls has been thoroughly tried as a remedy, and signally failed, as they show commendable taste in preferring a different diet. The only efficient remedy as yet practiced, is hand-picking. These insects will live for weeks, with a pin through their bodies; and through a bath of several hours, they still live and move, and have a being. We can well understand the devastation they cause, if we remember that they feed both as larvæ and imagos; breed continuously throughout the season, and that the female deposits somewhat over a thousand eggs. It would almost seem that "increase and multiply," was also spoken to these lower beings in creation, and what an example of obedience!

The seventeen-year cicada has also been among us, but only in the southern counties of the State. These insects live in the earth as larvæ for seventeen years, feeding on the roots of plants. Myriads of the imago often come forth from the ground in a single night. Leaving their detached pupa-cases on the ground, or hanging from some object, they go forth, the males giving out their dolorous sounds, while the female goes into the branches of various trees, forming incisions in which to deposit her eggs. Thus the luckless farmer may have his orchard pruned, not according to the most approved methods. The presence of this insect is not very alarming, as the pruning process only takes place at long intervals, and their mining operations are not as injurious as they would seem to be. The terrible accounts of their fatal sting, are to be reckoned among egregious humbugs.

Benj. D. Walsh, of Illinois, an admirable observer, and perhaps the best general entomologist in this country, has recently expressed the opinion, in the *American Entomologist*, that there is also a thirteen-year cicada, a different species, yet closely resembling the cicada septemdecim. By the way, this paper, which is published in St. Louis, would be an invaluable possession to every farmer. This digression will be pardoned by all who know the worth of the journal alluded to.

The oak tree caterpillar, larvæ of the *Dryocompa senatoria*—has been even less numerous about Lansing, than in 1867; though along the Michigan Central Railroad, especially in Kalamazoo, they have been fearfully numerous. In a communication from Judge Wells, of that place, written in September, it was stated that for three years the oaks had been entirely denuded of their leaves, and that nearly all the trees first attacked were dead. In Lansing, they only work on the red oak—*Quercus rubra*—though in Kalamazoo they were equally severe on the white oak—*Q. alba*—but did not attack this till the red oaks were well covered. As we published in the *Western Rural* of 1867, a full description of this insect and its habits, we will not again inflict it upon the public, but will only say that during the last days of June, a beautiful ochre-yellow moth, often with quite a reddish tint, its primary wings with a clear white spot, lays clusters of small white eggs on the under side of the leaves, which soon hatch. The larvæ are at first green, but towards maturity assume a yellow hue, with longitudinal dark stripes. After feeding till the middle of September—I have seen them till the very last—they enter the ground, don their pupa coat of brown, and await, in death-like quiet, the balmy June evenings, when the gaily-attired moth, the harbinger of so much mischief, lightly flits, not only in sylvan retreats, but also into our windows and around our study-lamp.

From experiments tried during the summer, we are convinced that syringing the trees with solutions, will avail but little. Keeping fowls under the trees, and violently shaking

the branches, is a somewhat effectual, but very laborious remedy. At the Agricultural College, we take great pains to encourage the presence of birds in our groves, and aside from the pleasure which we derive from their cheerful presence, we find them a powerful auxiliary against insects. I think they have greatly aided in ridding us of the *Dryocampa*. Farmers, do not destroy the birds! We expressed the opinion in the *Western Rural*, that these insects could not destroy the tree, coming so late in the season. At an unusually large meeting of the Boston Entomological Society, a few evenings since, I stated the question, and nearly all the members expressed the emphatic opinion that they could not greatly injure the trees.

In many parts of Michigan, the tomato worm—larvæ of the *Sphinx quinquemaculata*—have been frightfully abundant, doing much mischief. This fine, green larvæ, with its terminal spine and oblique, lateral stripes, the brown pupa, just beneath the surface of the earth, with the to-be sucking-tube of the imago incased in a jug-handle shaped tube, and the fine gray moth expanding several inches, are all too well known to need description. A peculiarity in the larvæ during the past summer, consists in the fact that a large number were nearly black, instead of green. Otherwise, the marks were as usual. As great an observer as Professor Agassiz, tells me that he has never seen an example of this kind.

Another item of interest was developed at the Agricultural College: the fact that hosts of the pupæ were taken from beneath the ground by skunks; the soil among the tomato plants being full each morning of little conical holes where these marauders had exhumed their prey. Thus, if we are fond of tomatoes, it is unkind to indulge any prejudice against these benefactors. The best remedy against these insects, is to hand-pick the larvæ. Great quantities were picked from the vines at the College, during the summer. No one need fear to pick them, as they are entirely harmless, and to one who relishes this vegetable, the work soon becomes easy and pleasant.

The larvæ of the codling moth—*Carpocapsa pomonella* Linnaeus,—though far less troublesome than in 1867, has been quite a nuisance during the past season. This beautiful moth, expanding scarce half an inch, deposits a single egg on the blow of the apple. From these eggs are hatched the white caterpillars, with brown heads—so familiar to all. After reveling in the juicy pulp of the apple for three or four weeks, becoming grown and turning to a reddish hue, they leave the fruit, crawl into some crevice or concealed spot, spin themselves a silken cloak, and assume the pupa condition.

Of course, all windfalls should be immediately fed to the hogs, as they generally fall before the larvæ leave them, unless, forsooth, some economical farmer wishes to save the apples for cider, in which case they should be ground and the juice expressed as soon as they fall, which I dare say will answer quite as well as keeping swine in the orchard. The *Western Rural*, in 1867, copied from the *Country Gentleman*, Dr. Trimble's method: to wind the tree with hay. The cocoons would be spun in this, and could be destroyed wholesale. It is stated that over a thousand were collected from one tree in a single season. This, no doubt would be excellent, if all would follow it. Mr. Walsh says that he has raised this moth from larvæ formed in the pear.

The tent caterpillar—*Clisiocampa Americana*, of Dr. Harris,—either from increased vigilance on the part of fruit culturists, from parasites or other cause, has become very greatly decreased in numbers, though the wild cherry trees of our forests were well filled during the summer. Thus, the direful cause of injury incalculable, is still among us. Let no farmer fail to exterminate the very last of these insects, either by cutting and burning the branches upon which the clusters of eggs are so nicely glued; or, what is not so pleasant, by crushing the larvæ after they are hatched and begin spreading their nets.

Perhaps one of the greatest insect pests in Michigan, at the present time, is the oyster-shell bark-louse—*Aspidiotus conchi-*

formis Gmelin. Who of us has not seen trees literally covered with this scale-like insect? And yet, very few know their history. Under the scales, from September till May, there are numerous small white eggs, which hatch in the last days of May. The larvæ, hardly visible without a lens, have a beak and six legs; move slowly for five or six days, and are of a yellow color. They then become attached to the bark, lengthen greatly behind, assuming by the last of August, that pear-shape form which ever after characterizes them. The male is quite different, being smaller, possessing wings when grown, and doing little harm.

The remedies for this evil are only less numerous than the individuals which enact it. I know a farmer in Shiawassee county who has a beautiful young orchard, free from lice. He washes the trees in lye each summer. Therefore, lye is a never-failing cure; whereas, Mr. Walsh has proved that though the applying of this may be of service, the lye is never of any use. Mr. Will. W. Tracy, Instructor in Horticulture at the Agricultural College, tells me that trees that were considerably affected a few years since, have recovered without anything being done. Therefore, no disturbance is a certain antidote for the evil. The more probable truth in this case is that the disappearance comes from some parasite, very likely the mite—*Acarus*—described by Mr. Walsh. Farmers are apt to generalize too hastily, from which arises all sorts of ill-founded beliefs, as in regard to equinoctial storms, moonshine in regard to planting, &c. This blind generalization, with no reason nor correct experiment for a basis, often involves great expense. Farmers, let us beware of all these humbugs; ever acting upon intelligence and reason, and not upon a result that is accidental, or rests upon a single experiment, where a score of other agents may act either alone, or in conjunction with the one used.

Mr. Walsh, in his first report as Entomologist of Illinois, shows that neither lye, nor any alkaline solution, nor tobacco

water, will in the least avail; while strong soap-suds, used as a wash just after the insects have hatched, is very sure to destroy them. Oily substances, as kerosene, will always kill any insect, or the vitality of any egg which it surely touches. Scrubbing with a harsh brush is excellent, if done when the young are just hatched, but has no effect on the scale. Of course, it is always well to scrape the scales off with a hoe, or other tool.

I disagree with Mr. Walsh, that good culture is of no service. I know of trees that have been quite badly affected for some years, yet are still vigorous and healthy. First rate care is ever useful in aiding vegetables to bear up against the evils that they are heir to.

The wooly lice — *Pemphigus*—which have so covered the beech during the past summer, and which are so very *courtesyous*, are, I think, more comical than dangerous; though if some mishap does not overtake them, they must suck much of the vitality from the beautiful beeches of our forests.

It is to be hoped that our farmers who have an excellent opportunity for observing, will improve it to the fullest. Be sure to preserve specimens of every injurious insect, and rest not till you know its character and history, in full. I will say, that any insect will be thankfully received at the Agricultural College, at Lansing, and, if possible, any desired information will be cheerfully afforded through the public press.

THE COLORADO POTATOE-BEETLE.

DOWAGIAC, January, 1869.

HON. SANFORD HOWARD—Yours of the 28th ult., requesting me to forward to you the results of my observations on the Ten-striped Potatoe Beetle, for the year 1868, &c., has been received, and I hasten to comply with your request. I do not know that I can do better than to enclose to you the daily journal which I kept through the season, in which you will perhaps find matter more to your purpose, than anything which I might compose outside of it. I commenced the journal with

the following objects in view: To ascertain the general habits of the insect; and, second, the best mode of warding off its ravages.

April 22. I planted village lot 112, to peach-blow potatoes. I planted early for the purpose of testing the truth of Mr. Barnard's statement made to me, September, 1867, that the ravages of the beetles were mostly confined to the yards planted earliest; and consequently that those planted later would mostly escape. On the first of May I planted an acre lot, with peach-blow and Neshannock potatoes, nearly opposite, across the street from the first lot. The difference of time between the two plantings was not so great as I could have wished, for the purpose intended; but still, in connection with other yards in town, planted still later, I had a fair opportunity of noting results.

May 25. Potatoes on lot 112 up, so as to show the rows. The beetles have already commenced making lodgments. It appears that on emerging from their winter quarters, and not finding their appropriate food near them, they rise on the wing to the height of eight or ten feet, and strike a "bee line" for a potatoe patch. I saw one to-day, for the first time on the wing. They fly heavily, but make a very pretty appearance. When they have made a lodgment and found their mates, they show but little disposition to roam further, but commence at once the work of propagation. They do not, however, commence to deposit their eggs, until three or four days from the time they emerge from the ground. From this time I visited the lot for several days in succession, and came to the conclusion that there were not many of them, and that if these were destroyed, there would be but little further trouble during the rest of the season.

June 17. I was at Decatur and found quite a number of beetles on some early planted potatoes, in the yard of Mr. Austin Barney, the first ever observed in the town. This is about twelve miles north-east from Dowagiac. On my return home I visited lot 112, and found several hills alive with the

slugs, in company with several perfect insects. These were at once destroyed.

June 20. Hoed both yards of potatoes, and found double, and treble the number of slugs and beetles that I did on the eighteenth; and also a few hills of the Neshannocks infested in the other yard. My man was directed to make clean work of them, myself also joining in the work of destruction. At night it was agreed that the work had been thorough and complete. Our method for destroying them was simply to pick off, leaf by leaf, all the leaves on which we found any of the slugs (as we now found scarcely any others), and placing them in a pile on the blade of the hoe, crush them under the sole of our boots. There are those here who just mash them between the thumb and fingers. It makes me shudder to think of it. But it is quite certain that the poisonous qualities of these beetles have been much overrated. That they are poisonous, I have no doubt, since neither birds nor domestic fowls of any kind will devour them. It is much easier to talk about ducks and turkeys "gobbling them up," than it is to induce the birds to do it.

June 29. Went down to the yards to see the condition of the potatoes, and to enjoy anew, my recent triumph over the slugs. But judge of my astonishment when I found ten times the number slaughtered on the 20th, feasting and gorging themselves upon the vines, and still more widely spread over different parts of the yard! "Where on earth do they come from?" said my man, as he surveyed the countless numbers around him. Where do weeds come from, said I, as from week to week they encumber the ground, through the season? "From seed in the ground, of course," said he. Well, these come from eggs previously deposited under the leaf, and not hatched out, when we slaughtered the slugs the other day. "Well," said he, despairingly, "we might as well give them up; it's of no use killing them." But do you give up your garden in despair because a second crop of weeds appears the next week after you have made clean work of them? Of

course not; you go at them again, and so we must do in case of these beetles and their slugs; we are enlisted for the season.

It was quite obvious, however, that some more expeditious way for their extermination must be devised, and more effectual remedies provided for warding off their ravages, or the potatoe crop must be abandoned. To think of going into a five or ten acre field of potatoes, well covered over with beetles and their slugs, and endeavor to rid the vines of them by picking them off and crushing them on the blade of your hoe, is simply absurd. Mr. A. H. Reed, a neighbor of mine, recommends brushing them off into the furrows, with a stick or hoe, as an effectual way to head them off. While Mr. Gibbs, another neighbor, is quite certain that to sprinkle the vines thoroughly with air-slaked lime while the dew is on, would be a sure remedy. To test the efficacy of these remedies, I first made with my hoe, a trench around several hills of potatoes, and then put a half-dozen slugs and beetles into the trench. It was amusing to see them struggle to extricate themselves from the ditch, and how, when they had nearly gained the top, their footing in the loose sand would give way, and they would roll and tumble to the bottom again. But they are wonderfully persevering and determinate. Some of the younger and more feeble ones gave up in despair, and were literally roasted alive in the hot sand; but by far the greater number, dust-be-grimed and travel-worn, found their way back to the vines in the course of a few hours, more voracious, if possible, than ever. In field culture on a large scale, I have no doubt, that with deep plowing between the hills, persisted in from day to day, the recommendation of Mr. Reed might be effectual, at least so far as to stay the ravages of the insect and to save the crop.

I next made an experiment to test the effects of lime. For this purpose I selected six beetles and six slugs, and placed them in the trench before described, and sprinkled lime over them so as to cover them mostly out of sight. In a few hours they all escaped from the lime and regained the vines. They

were then placed back in the trench, sprinkled with water, and then again covered with lime, as before. Again they succeeded in escaping from the lime, and all but one regained the vines. They were then placed back in the trench, sprinkled with water and covered with dry ashes, but with similar result—they all regained the vines. Mr. Gibbs sprinkled the vines of a small patch of potatoes in his garden, thoroughly, with lime, in the morning when the dew was heavy upon them. These vines were badly infested with beetles and slugs at the time. He said he meant to "kill or cure," but he did neither. The insects managed to maintain their footing, and finally destroyed the crop. Kerosene oil was recommended. I sprinkled several hills with it. The vines were killed, but the insects escaped. I tried snuff, but with no better success than with lime, or ashes.

It now occurred to me that I could rid the vines of the insects more readily by brushing them off into a pan, or some convenient vessel, than I could by hand-picking. To make this a sure thing, I flooded the bottom of the pan with four parts of water and one of kerosene, and then commenced the work. I found it to be, comparatively, an expeditious way, and very effectual in ridding the vines of them. They were killed almost instantly.

July 11. I went over lot 112 with pan in hand, and destroyed about fifty perfect insects. A large share of these were in pairs. I found no eggs. On the acre lot across the road I found but very few, and these on the Neshannocks.

July 13. Went over lot 112, and destroyed over eighty, and saw one on the wing. On the acre lot about 20 were destroyed.

July 14. Destroyed over 100 on lot 112, and 50 on the acre lot; these last were found mostly on the Neshannocks.

July 15. Weather very hot and dry; vegetation suffering for want of moisture. On lot 112, ninety were destroyed, and forty-five on the acre lot. Several beetles were seen on the wing. I still find the beetles mostly in pairs. I destroy each day all I can find, in going carefully over the yards, taking two

rows at a time. Where they all come from is more than I can determine. I find no eggs, and rarely a slug.

July 16. Found 68 beetles on lot 112, and about the same number on the acre lot. The number seen on the wing is on the increase. This, to me, is evidence that these beetles have but lately emerged from the ground, and are intent on finding their mates. A few egg-patches were seen on the leaves to-day.

July 17. Very hot and dry. The vines wither some in the middle of the day. Ninety beetles were destroyed on lot 112, and 70 on the acre lot. Quite a number of lady-beetles have been noticed on the vines; also, three varieties of what I at first took for squash-bugs, but afterwards found to be soldier-bugs, with their long harpoon bills thrust into a fine fat slug, and sometimes also into the perfect beetles, though the beetle was sometimes twice as large as the "soldier." But it was of no use trying to get away. They were firmly held, and sometimes upon the end of the harpoon suspended in the air. This exhibition of strength on the part of the "soldier," was really amazing.

Note 1.—By looking over the journal thus far, it will be observed that from the 25th of May, to the fore part of June, the perfect insect abounded on the vines. It was my aim to destroy these entirely, before they should deposit their eggs. But few of the slugs were seen. From the 10th of June to the first of July, the vines were covered, in places, with the slugs only, with here and there a perfect insect. From about the 8th of July to the 12th, the slugs rapidly decreased—that is, they came on from day to day in rapidly decreasing numbers; whilst the perfect insect continued to increase. It will be well to note, as the journal progresses, this preponderance from time to time, of the one or the other stages of the insect; remembering at the same time, that all of either kind, were destroyed from day to day that could be found.

Note 2.—It should also be observed that on lot 112, containing less than one-sixth of an acre, planted to potatoes, a much larger number of beetles and slugs were destroyed from

day to day, than on the entire acre on the opposite side of the street. Could this be in consequence of the difference between the times of planting? It was mainly to test this idea that the gardens were planted at different times. Or could this difference in point of numbers be owing, in whole or in part, to the fact of the more secluded position of lot 112 from cold winds during the fore part of the season, and a more sunny aspect, than the larger lot? It will also be observed that after the 17th of July these numbers were largely reversed.

July 18. I find the insects are increasing in numbers, notwithstanding all my diligence in destroying them from day to day. The mystery of this was, to-day, in part disclosed. About 10:30 A. M., as I was engaged in destroying all the beetles I could find on the vines in lot 112, I perceived, all at once, large numbers of beetles alighting around me. They came in a direct line from a yard about 40 rods distant, in which all the potatoes (an early variety) had been harvested the preceding afternoon. The beetles, with which these vines had been largely infested, had this morning taken the wing in search of better picking. They continued to come until I had destroyed over fifty of them, when all at once the immigration ceased. But why did they all alight in my little patch? Why did not some of them alight on a small patch belonging to Mr. Scott, immediately over the fence? This patch had been planted about two weeks after mine had come up; and until this time, and for some time later in the season, had remained free from the beetles. I had concluded this might be owing to the difference in the time of planting; but at *this* time the vines were good and fresh. Why, then, should they remain free, while mine were so badly infested? Was it owing to difference of varieties? Those in Mr. Scott's yard were Shaker Russets. Here, then, for the time being, the question as to the influence of different varieties or of difference in the time of planting, or both, seemed pretty well settled. But this conclusion, like several others to which I arrived during the progress of the season by subsequent events, was very

nearly set aside as futile. As, for instance: I had noticed that a stray hill of Shaker Russets that happened in the patch, had entirely escaped the ravages of these insects, and had thence concluded this was on account of the peculiar variety. In a day or two after this, that identical hill would be well covered by them, and the immediate adjoining hills entirely free. Then, again, on noticing that the insects were more abundant on some thrifty vines in a particular portion of the yard, the conclusion has been reached that this was on account of the greater luxuriance of the vines; the very next day, perhaps, has exhibited them by the dozen, upon some poor, half dried-up hills of the most uninviting appearance imaginable; and so on, in a great variety of instances. Verily, these potatoe-beetles are queer "bugs!"

July 20. Still clear and very dry. On lot 112, 112 beetles were destroyed, and on the acre lot, 225! These were the accumulations of two days. But one was seen on the wing. Several hills were found with a few slugs upon them—the first seen for some time. These insects are evidently getting the start of me, notwithstanding all my diligence in destroying them.

July 21. Destroyed 55 on lot 112, and 312 on the acre lot. Saw five on the wing. The beetles taken to-day were largely in pairs. Several hills were found infested by the small slugs. The beetles have fairly got the advantage of me. Their eggs are scattered all over the yard.

July 22. Still hot and dry; vegetation suffers severely. Caught 35 beetles on lot 112, and 213 on the acre lot; saw two on the wing.

July 23. Cloudy; wind south and very warm. Caught 25 beetles on lot 112, and 205 on the acre lot. The slugs are rapidly on the increase. The beetles are still largely in pairs. I tried strong brine, in my pan yesterday. It was not so deadly as the kerosene and water. In the afternoon of to-day, I hoed among the vines on the acre lot to ascertain whether there

were any beetles emerging from the ground, as it is quite a mystery where they all come from, as they appear from day to day. I found none emerging from the ground, but saw as many as twenty on the wing, coming in from other yards, and as many more flying from one part of the yard to some other part. During the time I continued my work this afternoon, I destroyed 136 beetles. My usual time of going through my yards for the destruction of these insects, is from 9 to 11 in the forenoon; and although I go through the vines row by row, and carefully examine every hill as I pass, it is certain that I miss many of the insects concealed under the leaves, or down among the vines. It is also certain that large numbers come into the yard daily from abroad, so that I have the whole neighborhood to contend against. Many yards within the village are already badly eaten over, and some, of early varieties, have been harvested. This makes emigration necessary, to obtain fresh food. They fly most between 10 A. M., and 5 P. M. A warm sunny day suits them best, with wind steady or still. In going over some neighboring yards, I find that beetles have commenced upon the vines of late planted potatoes.

July 27. I gathered 50 beetles on lot 112, and 210 on the acre lot. Two-thirds of these were in pairs. The slugs are still increasing.

July 28. Caught 40 on lot 112, and 100 on the acre lot. Slugs not so numerous as yesterday, which, being on Monday, comprised the growth and accumulations of two days. The growth of the slug, after leaving the egg, is astonishing. It attains to one-fourth its entire size in forty-eight hours. So that if you destroy every living specimen to-day, by day after to-morrow your vines will be literally covered with them.

July 29. A warm rain during the forenoon. In the afternoon the sun came out fine and warm. Gathered 126 beetles on lot 112 and 192 on the acre lot; largely in pairs. Saw many on the wing.

July 30. Warm and hazy. Caught 113 on lot 112, and 162 on the acre lot.

July 31. Warm and cloudy. Caught 80 beetles on lot 112 and 251 on the acre lot. The slugs still increasing in numbers. Mr. Phillips informed me to-day, that in Berrien township eight miles west of Dowagiac, the American *Cantharis* beetle is infesting his vines very much. Several other farmers have reported them as in their yards. I also hear from different parts of Berrien county that the striped, or "new potatoe bug," has been observed. They are also scattered in various directions through the western and northern townships of Cass county, and a few fields are badly injured. I found one of the *Cantharis* on my vines to-day, and having my curiosity somewhat excited, I commenced a more critical examination. I had been informed that the *Cantharis* would devour the *Colorado* beetle whenever they came in contact. During my search this morning, I found several of the *Cantharis*, hid among the leaves under the lower part of the vine, and on the ground, the wing-covers of two of the striped beetles. It may be that bug will eat bug, after all. Still I do not regard this as positive evidence, by any means.

Aug. 1. It rained hard during the night and the greater part of the forenoon. This may save the crop, if I can keep the "bugs" off. I caught 110 on lot 112, and 227 on the acre lot. More than two-thirds of these were found in pairs. Many slugs also were destroyed.

August 3. Destroyed 79 on lot 112, and 263 on the acre lot, with still an increased number of slugs.

August 4. Caught 45 beetles on lot 112, and 163 on the acre lot, mostly in pairs, and four times that number of slugs. I commenced to-day to test the question as to any preference these beetles may have, for one variety of potatoes over another. I went through the field where the Neshannocks and Peach-blow varieties adjoin, taking two rows of each variety. I found 12 beetles on the Neshannocks and 2 on the Peach-blows.

August 5. Caught 43 beetles on lot 112, and 84 on the acre lot. On the trial rows, 4 were destroyed on the Neshannocks and none on the Peach-blows. There appears to be quite a decrease of beetles for the last two days, but a steady increase of slugs.

August 6. Cool nights and mornings. Caught 24 beetles on lot 112, and 80 on the acre lot. The experiment rows show, 5 on the Neshannocks and 3 on the Peach-blows. The decrease in the number of beetles may be owing to the coolness of the weather, and the unevenness of the winds, which prevent them from flying in from other yards.

August 8. Caught 87 on lot 112, and 77 on the acre lot, and over 1000 slugs. On the trial rows, seven were caught on the Neshannock and three on the others. The slugs on these rows are in about the same proportion.

August 11. Caught 31 beetles on lot 112, and 71 on the acre lot. On the test rows, three on the Neshannocks and one on the others.

August 12. Only 53 beetles were caught on the acre lot. The cool weather hinders them from immigrating from the neighboring yards.

August 15. Caught 16 beetles on lot 112, and 42 on the acre lot. The slugs still increasing.

August 18. Caught 107 beetles on lot 112, and 142 on the acre lot, and about a quart of slugs. On the test rows 19 beetles were caught on the Neshannocks, and four on the Peach-blows. Slugs in the same proportion. These tests seem to establish a preference of the beetle for the Neshannock variety. Indeed, on that part of the acre lot (about one-sixth part), I gather more beetles and slugs day by day, than on all the rest of the lot.

August 19. Caught 66 beetles on lot 112, and 113 on the acre lot, and a quart of slugs.

August 21. Caught 102 beetles on lot 112, and 116 on the acre lot; and three pints of slugs. Spent 8 hours in going over the yards.

August 24. My man reports 500 full-grown beetles destroyed on both lots, and over two quarts of slugs. He spent all day at them, and charged \$1.50 at night. In a walk yesterday, I discovered along the side of the railroad track, near the depot, a plant that was new to me, of the night-shade family, known in Virginia and Carolina as horse nettle (*Solanum Carolinensis*). This was well covered with the Colorado beetle and its slugs. So far as I have been able to discover, this is the only plant beside the potato, upon which the Colorado or New Potato bugs will voluntarily feed. In their wanderings in search of food, after having entirely devoured a potato-patch, there will, sometimes here and there one, be found upon the tomato or henbane, or upon the ground-cherry, but not to remain there as of voluntary choice.

Mr. Wilson, a neighbor of mine, who has been emulating my example in his endeavors to save his crop of potatoes from the devastation of the Colorado potato-beetle, gave up to-day *whipt*. He says it's of no use fighting potato bugs; that they increase faster than he can kill them; that on Friday he caught 250 beetles and as many slugs on his small patch; on Saturday 500, and this morning (Monday) they had multiplied into thousands, and he told them to "go it," and he would let them; that they couldn't do much hurt anyhow.

August 29. We caught 300 beetles on both lots, and a peck of slugs.

September 9. It has been rainy and cold, more or less, during the week past. The slugs have not increased much. The beetles begin to preponderate again. I perceive that these beetles prefer vines of not the most luxuriant growth. I perceived several beetles on the ground-cherry (*Physalis viscosa*) to-day. They take to it from necessity, not from choice. The weather has not been favorable for flight. They have been compelled to crawl from place to place in search of fresh food. Hundreds of them may be seen daily, on the sidewalks, in the public highways, and upon the fences, wandering in all directions, in search of food.

September 14. On my return to-day from a few days' absence, I sent my man into the acre lot of potatoes to look after the beetles. In about two hours he reported over 1,000 beetles, and a very few slugs destroyed on the two outside rows around the field. The beetles seem to have collected on the rows nearest the fence for protection from the cold of the past few days. The other portions of the field were almost entirely free from them. I confess to a feeling of self-satisfaction, at having thus finally triumphed over these ravenous insects. My potato vines were almost entirely free from any appearance of devastation, and the crop fast maturing for harvest, while those of my neighbors were mostly ruined. "Now, Mr. Whitlock," said I, "let us go into lot 112, it is but a small patch, and just whip around the outside rows, and our triumph will be complete. We shall have no more trouble with them this season." But what was my utter astonishment on going into the lot, to see, on the three rows next to Mr. Scott's patch, thousands upon thousands, and ten times ten thousand of thousands of these beetles, covering every leaf and stalk remaining upon these rows; slowly, steadily, but perceptibly moving forward to the fourth and fifth rows, devouring as they move, and leaving naked desolation behind them. They had made a general immigration during my absence, from the patch of Mr. Scott, and another patch adjoining his, which, although comparatively so free from ravage at an earlier stage of the season,—owing as I had concluded, to a later planting, or difference in variety,—had later in the season been entirely devastated by them, and the crop ruined. For this reason they had crawled through the fence and made a general onset upon the vines in my yard. I saw at once that it was useless for me to spend time over them. I was completely "*out-flanked*." My only consolation was, that owing to the near maturity of the crop, they could work me no further damage, and to the fact that the frosts would in a few days at most, stew them and the vines up together. So we concluded to leave them to their feasting and their fate, with the understanding that I was to have the

privilege of using them for experimental purposes during the remainder of the season.

September 16. Clear and cold all day. Tried an experiment with boiling hot water, sprinkled from a watering-pot, upon a hill of potatoe vines, covered by over 300 beetles. They dropped instantly, at the touch of the water. But the shower was continued upon them until the vines wilted as from the effect of a severe frost. The vines were then lifted; the beetles were found lying on their backs, the ground literally covered, but all, except about twenty, "alive and kicking."

September 17. Frost this morning; but not sufficiently severe to kill the potatoe vines, or to have any sensible effect upon the beetles.

September 18. Frost again this morning; but the beetles are still alive and in full action in lot 112. Toward evening I brushed off the beetles from several hills of the vines, and turning the vines away from them, left them exposed upon the naked ground, in order to test their power to endure the cold.

September 19. Frost again this morning. The ground slightly frozen. The beetles are still alive, and slowly crawling back to the vines. The warm rays of the sun revives them rapidly. They have advanced on lot 112 two rows within the past five days. Not a leaf is left behind them. There is not a live slug anywhere to be seen. They all disappeared on the approach of cold weather. Where they all went to I do not know; but I saw several of them in the act of burrowing in the ground. On searching, however, I have not been able to find any of them. They may have penetrated to a considerable depth, to escape the effects of frost or other exposure.

October 6. My man reported to-day, that on making an excavation for the carcass of a cow, on the premises of one of my tenants, he discovered at the depth of four and five feet, a dozen or more beetles in a partially dormant state. On being exposed to the sun and air, they became lively and active.

October 23. The ground was frozen at least an inch in depth this morning; yet numbers of beetles were found, still alive, where my man was digging potatoes. He said he found many beetles in the hills among the potatoes.

November 17. In taking up some fence posts on lot 112, we found many beetles burrowed down the sides of the posts, to the depth of one and two feet. They were alive and able to crawl around, seeking shelter from the cold.

December 30. Mr. Phillips, from Berrien township, was at my house to-day. He informs me that during the month of October he gathered from lot 112, thirty-one beetles. These he buried in an old paint keg, and left them at the corner of his house, exposed to the drippings from the roof. They remained there during the extreme cold in the fore part of this month, (December,) when the thermometer sunk to eight degrees below zero. He then exposed the keg to ninety degrees of heat, until the frost was entirely out of it; then on searching for his beetles, he found thirty of them alive and active! Not having their appropriate food for them, he kept them alive on cabbage-leaves for over two weeks; but they did not seem to eat much. My opinion is, they did not eat at all, or if they did, not enough to have kept them from starving to death in due time. The experiment is valuable as testing the amount of endurance of these insects.

From the preceding notes and observations, the farming community may learn something concerning the character of the enemy approaching them, and the amount of danger to be apprehended.

JUSTUS GAGE.

Dr. Henry Shimer, in an article in the *American Naturalist*, considers some of the causes why the Colorado potatoe beetle was less numerous in Illinois during the season of 1868, than in the previous year. The first is the unusually mild weather during the autumn of 1867, which he thinks induced the pupæ of the last brood of the beetle to mature and come to the sur-

face, instead of remaining in the ground over winter; the lack of food in the fall, together with the cold, open winter following, destroying great numbers. Another cause which he thinks contributed to their destruction, was the very hot and dry weather of July and August. He thinks the delicate pupæ, "exposed to the dry, burning dust," could not live. He supposes they go into the ground to pass through their transformations, because they are there protected from the "hot, dry atmosphere of summer, and the cold frosts of winter;" but this time the ground failed to give them the proper shelter, and they perished. He says he has often noticed that the pupæ of various insects perish from exposure to too much evaporation.



HEREFORD COW CARLISLE, AT FOUR YEARS OLD. (See page 218.)

THE HEREFORD BREED OF CATTLE:

ITS HISTORY AND CHARACTERISTICS.

Among the various breeds of cattle which are held in high estimation at the present day, none have had a longer career of fame than the Hereford. It takes its name from the county of Hereford, in England. In the adopted classification of British cattle, it belongs to the Middle-Horns, which are admitted to be of untraceable antiquity. Whether they were brought to the "Islands of the Northern Sea," by some of the races of men which settled there before the historic period, or whether the early inhabitants found them there in a state of natural liberty, are questions that cannot be answered. How long the Herefords have possessed the peculiar traits or features which now characterise them as a breed, it is impossible to say. There is evidence that they were called by their present name more than two hundred years ago, but the authorities of those days are silent as to the color and other special points of the stock.

There is no doubt, however, that the breed has undergone considerable change since the time of the earliest notices of it that have come down to us. It is not improbable that the color has been changed. People who lived to within a late period, stated that they had seen persons who remembered the introduction of the present popular white face; but as to the way in which it came, accounts do not entirely agree. But it should be borne in mind that color is not one of the strongest and most persistent characteristics of animals; and hence it is by no means necessary to suppose that changes of color in the

Herefords were the result of the introduction of alien blood. Even among wild animals, color is not absolutely invariable. The Bison and the Musk ox are the only representatives of the Ox Tribe belonging, naturally, to America. It is the testimony of persons who are familiar with the former, as he appears on our western plains, that though the mass of them are black, or brownish-black, white ones are sometimes seen. If these white animals breed, as they probably do, the general tendencies of the race are toward the opposite color, so that any individual peculiarities which appear, are soon lost. If the animals were under man's control, so that males and females possessing the rare color could be placed by themselves, there is reason to suppose that in the course of several generations a white variety or breed might be produced. We know that white deer are sometimes found, and that among the smaller animals,—as squirrels, mice, &c., and also in birds, as crows, blackbirds, robins, &c., this color appears. Among the wild cattle confined in parks in England and Scotland, which are generally white, there are sometimes produced spotted and even black calves, but they are not allowed to live long. Among the Highland cattle of Scotland, whose prevailing color is black, there are now and then white ones.

From what is called *albinage*, full-blood African men and women are sometimes perfectly white. Whether some of the changes above referred to are due to this principle or not, we have examples both in the human family and in the lower animals, showing that the peculiarities may be perpetuated by uniting individuals of similar traits and tendencies. In like manner certain colors or markings in the Hereford and other breeds of cattle may have been, in a degree, fixed or established. We know that in a state of domestication, the tendency of animals to vary in color is much stronger than in a wild state. Wild birds, as turkeys and ducks, when bred for generations as tamed poultry, frequently assume colors varying greatly from the original ones; and it has been demonstrated that by selecting specimens of any particular color, and breed-

ing from them, and thus continuing to select and breed from the progeny, the desired color may be increased.

It has already been remarked that it is impossible to tell what was the original color of the Hereford cattle. The first systematic attempt to improve them, of which we have any record, was made by Benjamin Tomkins, of Wellington, near Hereford, who, in the year 1766, purchased two cows as the foundation of his herd, which became widely celebrated for many years, and to which nearly all the best Herefords of the present day are more or less related. Mr. Tomkins was a contemporary of Robert Bakewell, who, even at the early period mentioned, had become noted as a breeder of domestic animals; and it has been said that the Hereford cattle-breeder took lessons from the great improver of the Long-horns, which were serviceable to him at the commencement of business. At any rate, the first selections of stock by these eminent breeders, appear to have been made on a similar principle. Bakewell selected his first females—a couple of heifers—from a stock which first attracted attention from its tendency to fatten, and Tomkins, according to the current belief in the neighborhood where he lived, purchased his first two cows from a mechanic, in whose hands they had been much admired on account of their flesh-forming propensities. Mr. Eyton, the founder of the Hereford Herd-Book, was informed by a daughter of Mr. Tomkins, that one of the cows was a gray, and the other a dark red, with a spotted face; that he called the former *Pigeon*, and the latter *Mottle*. Mr. Eyton thought that these two cows and their progeny were for a while crossed with the best selected herds in the neighborhood, but that during the latter part of Mr. Tomkins's life he used none but bulls bred by himself, and did not cross with any other stocks. He appears to have kept up a distinction in the descendants of the two cows mentioned—the *Pigeon* branch and the *Mottle* branch being frequently referred to.

It is proper to remark here, that the colors possessed by these branches or families of Herefords have always belonged to the

breed as far back as it can be traced. Of late years some controversy has arisen as to which is the oldest color, but without much progress towards a settlement of the question. Some of the cattle of Wales were spoken of more than eight hundred years ago, as "white, with red ears." Herefordshire adjoins Wales, and some persons are inclined to the opinion that in the gray and lighter colors of the Hereford cattle, are to be traced an affinity with the Welsh breed mentioned, which, according to the authorities who speak of it, was held in high estimation. The late Rev. J. R. Smythies, of Lynch Court, Herefordshire, for forty years an extensive and noted breeder of these cattle, in a communication to the *Mark-Lane Express*, said: "The grays are considered the oldest breed;" and Mr. E. F. Welles, in a published letter on "The Color, Form, and Breeding of Hereford cattle," in speaking of Mr. Tomkins's herd and its management, remarks that Mr. T. "was a disregarder" of color, "but if he had a preference, it was, perhaps, to the gray, a color he began with and esteemed to the last."

It is worthy of notice that at the time Mr. Eyton commenced the *Herd-Book of Hereford Cattle*, in 1846, it was thought important to recognize four colors as legitimately belonging to the breed. Hence in recording the pedigrees, he inserted the letters "M. F." for mottle-faced; "W. F." for white-faced; "G." for gray; "L. G." for light-gray. Colored portraits of bulls, drawn and engraved on stone by Mr. Welles, representing these four colors, are inserted in the first volume of the *Herd-Book*. It may be well to explain that the so-called gray color is not just like what is called *roan*, in *Short-horns*. Mr. Duckham, who has edited the *Herd-Book* since the second volume, in his lecture on the Hereford breed of cattle, before the members of the Royal Agricultural College at Cirencester, thus describes the grays, or *dark-grays*, as they are called in contradistinction to the light-grays: "They were so called from the white stripe which extended the whole length of the back, and also from the parts usually now white on the

different parts of the body being thickly interspersed with small red spots." Some of the light-grays have a more intimate intermingling of light-red and white on the sides of their bodies, producing a rich color, not unlike a strawberry-roan. There is evidently a tendency in these light-grays to run to a still lighter color in the progeny—reverting, perhaps, to the old Welsh stock before alluded to. The Mark-Lane Express reporter of the Birmingham fat-stock show of 1857, said: "Is there such a thing as a white Hereford? There was one entered and shown as such," &c. Mr. Duckham answered the query through the same paper, in the affirmative. Subsequently the writer of this article saw at the exhibition of the Royal Agricultural Society at Chester, a white Hereford cow, shown by Thomas Taylor. She was a handsome cow, with all the Hereford characteristics of shape and handling. Beauty, the dam of the bulls Conservative and Young Brockswood, 478 and 486 of the Herd-Book, is described as white. Yet she was a prize-winner, and when fourteen years old, had been the mother of fourteen calves, several of which were very fine. Conservative was red with a white face, and Young Brockswood was a light-gray. His portrait is given as the representative of that family, in the first volume of the Herd-Book. But of late years the prevailing taste among the Hereford breeders has been in favor of the red with white face color, and the result is that the other colors have been constantly diminishing.

It appears that Mr. Tomkins's herd for a long time maintained its ascendancy as the chief nucleus for the dissemination of blood with which to improve other herds. H. H. Dixon, in a prize essay on Hereford cattle, lately published in the Journal of the Royal Agricultural Society, relates a conversation which he had with the late John Monkhouse, a well-known breeder of Herefords, that indicates something of the high estimation in which the Tomkins stock was once held. Mr. Monkhouse stated that when, in 1809, he was about to commence business, and was looking around for materials to form the basis of a

herd, he thought it might be expedient to purchase some of the Tomkins stock, and therefore called on Mr. T. to ascertain on what terms animals could be obtained. "He asked," said Mr. Monkhouse, "a hundred guineas (not pounds) for an in-calf heifer to calve at Christmas." The price seems to have taken the young farmer so much aback that he deferred the purchase of any of Mr. Tomkins's stock.

Other portions of Mr. Monkhouse's remarks, as given by Mr. Dixon, show that the Hereford breeders of sixty years ago were inclined to propagate their stock somewhat in families, according to the colors that have been mentioned. Mr. M. said he found Tomkins, Price and Smythies "the great mottle-faced men;" that Tully and Knight "had the best light-grays;" and that Walker, Hewer, Yeomans, and Weyman "were the most noted for the white-faces." Notwithstanding the remark in reference to Mr. Tomkins's herd being noted for the mottle-faces, and other statements indicating the partiality of that gentleman for the grays, Mr. Eyton, in his account of Mr. Tomkins's herd, in the appendix to the first volume of the *Herd Book*, says the bull often referred to as the "Silver Bull," Mr. Tomkins "always considered as the first great improver of his stock," and that "he was a red bull with a white face, and with a little white on his back."

We have not been able to ascertain the precise date of the death of the pioneer improver of Herefords, but the sale of his herd took place on the 18th day of October, 1819, which Mr. Eyton states was soon after Mr. Tomkins's death. His career as a breeder must therefore have extended through a period of more than fifty years. At the sale, fifty-two head of cattle, including one bullock, six two-year-old steers, ten yearling steers, six steer calves, and three heifer calves, brought an average of £89 17s. 6d. each. A two-year-old bull was sold to Lord Talbot for £588; three other bulls brought £147, £162 15s., and £173 5s. each. Six cows brought from £210 to £278 each.

Before the death of Tomkins, not a few other men had taken up the breeding of Herefords professionally, and aided in extending their fame. Next to Tomkins in point of time, appears to have been Tully of Huntington, who worked chiefly with the grays, and with such success that his stock, under the name of "the Huntington breed," became celebrated. Tully of Clirow was noted both as a breeder and grazier. Thomas Andrew Knight, the eminent pomologist—well-known on both sides of the Atlantic for his valuable labors in the origination of new varieties of fruits, and for his writings on that subject—was a distinguished breeder of Herefords, his fancy also inclining to the grays.

Early in the present century, John Walker, of Burton, near Worcester, John Price, of Upton-upon-Severn, Worcestershire, and the Rev. J. R. Smythies, of Lynch Court, near Hereford, were prominent breeders. There were other breeders of less note. The formation of the Smithfield Club—first called "The Smithfield Cattle and Sheep Society"—in the year 1798, no doubt greatly aided in bringing the Herefords conspicuously before the public, and in making them known not only throughout Britain, but also on the continent of Europe, and in America. The object of this association was to encourage the economical production of good meat. Its early exhibitions brought together the best specimens of the leading breeds of cattle and sheep in the kingdom. There can be no question that, at this period, the Herefords stood clearly above any other breed of cattle for fattening properties and quality of beef combined. At the first exhibition of the Club in 1799, Mr. Westcar took the first prize with a Hereford ox, which the History of the Club states was sold for a hundred guineas; also that he was 8 feet 11 inches long, 6 feet 7 inches high, and 10 feet 4 inches round the girth. It appears that this ox was bred by Tully of Huntington. It is also stated that a Hereford ox, exhibited at the same time by Mr. Grace, of Buckinghamshire, was 7 feet high, and measured in girth 12 feet 4 inches. The record does

not give the names of all the prize-takers at this exhibition, but it states that besides Mr. Westcar, the Duke of Bedford, Mr. Edmonds, and Mr. John Ellman were "winners," the last named gentleman "for the best ox fattened with grass and hay only, in the shortest time from the yoke." Mr. Duckham, in his lecture before alluded to, remarks in reference to the awards on this occasion, that as the Duke of Bedford and Mr. Ellman were both breeders of Herefords, it is fair to infer that three out of the four winnings mentioned were with Herefords.

The records of the Club state that in 1800 the cattle prizes were won by Herefords, Sussex, and Long-horns. The records of the shows of 1801, '2, '3, '4, '5, and '6 are stated by Mr. Gibbs, in his History of the Club, to be incomplete, and it is therefore impracticable to tell how the awards were made. There is some probability, however, that the first prizes for oxen during these years were for Herefords, as it has been stated that Mr. Westcar, who took the first prizes in 1799, also took the first prize with a Hereford steer or ox for twenty years in succession. On this point Mr. Duckham quotes the following from a letter of Mr. Arnsby, in *Bell's Weekly Messenger*, May, 1857: "Mr. Westcar took the first prize with a Hereford ox for twenty years in succession, at the London Cattle Show, which was open to all kinds of cattle against Mr. Westcar." It should be stated, however, that the rules of the Club were not always the same. From its formation to 1807, inclusive, all breeds competed together. From 1807 to 1815, inclusive, separate prizes for fat oxen or steers were offered for Herefords, Long-horns, Short-horns, Sussex or Kent, Devons, and Mixed Breeds, with an additional prize "for the best ox or steer in these classes." It was provided that "the animals exhibited for the above premiums must have worked at least two years ending the 1st of January, 1807, and must not have been put to fatten previous to that day. No cake must have been given previous to the 5th of April, and the whole of the food con-

sumed from the 1st of October to the 30th of November must be certified, under the attestation of two respectable witnesses."

In the minutes respecting the exhibition of this year (1807), it is stated that "there were no exhibitors for the Long-horn, Short-horn, and Sussex prizes," and that "the prize in the class for Devons was not adjudged, for want of sufficient merit." This, of course, would leave only the Herefords and "Mixed Breeds" in competition, so that the probabilities are strongly in favor of the Herefords for the extra prize. In 1808, it is said: "Again, this year, there was no exhibitor for the Long-horned prize;" and that "the only exhibitor for the Short-horned prize was disqualified." In 1809 it is said: "For the Short-horn and Sussex prizes there were no exhibitors." In 1810 it was resolved: "That the conditions respecting Long-horned and Short-horned oxen having been worked, be dispensed with." The rule appears to have been continued in regard to other breeds, and it was specified in 1811, that "Hereford, Sussex, and Devon oxen or steers be shown in pairs, or yokes, of the same age;" but when the exhibition came, it appears "there were no exhibitors for the prizes for yokes or pairs of oxen in the Hereford or Devon classes." In regard to the exhibition of 1812, some minutes are made respecting the color and markings of animals shown; as that there was a Hereford "with a red ring round his eye," and a "smooth-coated Hereford." From which it would be inferred that Herefords at that day had generally white round the eye, and that they were chiefly full or rough-coated. It is also mentioned that a "red frosty-faced Sussex" was exhibited, and a "red and white Devon,"—facts which are worthy of note in reference to the tendency of breeds and races to vary in color, as before alluded to in this essay.

After 1815 to 1852, the classification of cattle according to breed was discontinued, and they competed together under the same regulations that existed previous to 1807. Mr. Gibbs, in his History of the Club, submits a tabular statement, showing the number of prizes and amount of money won by each breed

of cattle during the period that all breeds competed together. The records from 1799 to 1807 being incomplete, they are omitted in all breeds. If they could have been properly included, there is no doubt they would have rendered the final results more in favor of the Herefords. As they now stand, however, they show that in the classes of *oxen and steers*, the Herefords were awarded 185 prizes, amounting to £2,758 2s.; the Short-horns 82, £1,399 5s.; the Devons 44, £622 10s.; the Scotch 43, £500 15s.; the Sussex 9, £178 10s.; cross-breeds 8, £108 5s. In the classes of *cows and heifers*, the Herefords took 22 prizes of the value of £231; the Short-horns 92, £1,132 15s.; the Devons 4, £40 10s.; the Scotch none; the Sussex 3, £36; the Long-horns 6, £63 18s.; cross-breeds 6, £101 10s. In the aggregate the Herefords took 207 prizes of the value of £2,989 2s.; the Short-horns, 174, £2,532; the Devons 48, £663; the Scotch 43, £500 15s.; the Sussex 12, £214 10s.; the Long-horns 10, £153 8s.; the cross-breeds 14, £209 15s.

It will be noticed that in oxen and steers, the prizes taken by the Herefords are only five less in number than those taken by all other breeds and cross-breeds combined. Were the records complete, they would probably show the prizes to Herefords in these classes, in excess of all other breeds. It will be noticed that the Short-horn cows were much more successful in winning prizes than Hereford cows. Mr. Gibbs remarks, in relation to this, that "the Short-horns owed the fact of their *approaching* the Herefords in total amount of winning, to the success of the Short-horn cows." Mr. Duckham explains the result on the ground of the effort of the Hereford breeders having been chiefly directed to the production of the best steers and oxen. He says:

"The soil of the county of Hereford being neither applicable for dairy or feeding purposes, those who have cultivated it for ages have made it their study to breed steers and oxen, which should, by their superior quality and aptitude to fatten, com-

mand the attention of the distant grazier. The success with which they have done this has been shown, and the demand which continues to exist, proves that there is no falling off in the superiority for the grazier's purposes. Perhaps there is no finer sight for the admirer of cattle than appears at the annual October fair at Hereford. On those days several thousands of steers pass from their breeders to the graziers who occupy the fertile pastures of Bucks, Northampton, Kent, Essex, &c., and whatever may have been their original color and distinctive marks in days of yore, their present uniform appearance cannot fail to impress those who attend that fair for the first time, with a degree of surprise and admiration,—line after line of them, as they appear in the streets of the city, all displaying a similarity of character, and at once claiming each other as one family."

Allusion has already been made to the advanced position, as beef cattle, which the Herefords for many years occupied, compared with other breeds. The old breeders frequently gave challenges to show a certain number of cattle against an equal number of any other breed. Thus, Mr. Eyton mentions that "So confident does Mr. Tomkins appear to have been in the superiority of his stock, that he once drove twenty cows to Hereford, on the day of the agricultural show, and offered a hundred guineas to any one who would show an equal number superior to them; the offer, however, was not accepted."

At first the Long-horns were considered the special rivals of the Herefords; more especially the family of Long-horns that had constituted the stock of Bakewell and his associates and followers. Mr. E. F. Welles, in a letter to Mr. Eyton (appended to the first volume of the Herd-Book), states that the late John Price, in the year 1812, gave a challenge to show twenty of his Hereford cows in milk, against twenty Long-horn cows, for one hundred guineas, which was accepted by Mr. Meek, and decided in Mr. Price's favor. When the Improved Short-horns came into notice, similar challenges were made to the

advocates of that breed, as will be more particularly noticed elsewhere.

Mr. Price was for many years an eminent breeder of Herefords. He appears to have commenced early in the present century, with stock from the noted herd of Mr. Walker, of Burton, and about the year 1804, according to Mr. Welles, purchased a few cows of Mr. Tomkins, which were put to Walker-bred bulls. Mr. Welles says "the cross did not suit," so far as relates to some of the first animals thus produced, and it seems that Mr. Price afterwards ran more into the Tomkins blood. Mr. Price had several public sales of his stock, of which the particulars of two only seem to have been preserved. The first sale was in 1813, at which, as Mr. Eyton states, the aggregate sum received for the cattle was £3,077. At the sale of 1816, 186 animals—of which twenty-one were heifer calves, and six bull calves—brought an average of £41 3s. per head. Four bulls sold at from £105 to £147 each, and three at £241 to £283 each—the latter being for Wellington, eight years old, bred by Mr. Tomkins. Six of the cows brought an average of £176 each—the highest price being £252. At his closing-out sale, in 1841, 108 animals brought an average of £49 11s. each. Three of the cows brought from £100 to £150 each; and six bulls from £100 to £166 each.

The late Rev. J. R. Smythies commenced the breeding of Herefords in the year 1802, and continued the business till 1843. He purchased his first stock of Mr. Tully of Clirow, a relative of the noted Huntington breeder of the same name. He was induced to adopt this stock by the recommendation of the celebrated grazier Mr. Westcar, of whom mention has before been made. Mr. Smythies relates that, meeting Mr. Westcar at the Hereford Fair, Mr. S. informed him it was the *fiftieth* he had attended, "without missing one;" that he grazed five hundred oxen every year, and that the Tully beasts were the best he ever fed. Mr. Smythies had a public sale in 1823,

at which 66 head of breeding cattle were sold. At his final sale, in 1843, 131 head were sold. We have not the prices obtained in either case.

Mr. Smythies was an earnest advocate and defender of the Herefords while he was a breeder of them, and even afterwards. In 1822, a controversy arose in the London Farmers' Journal, between Mr. Smythies and Mr. James Armitage Rhodes, in regard to the relative merits of the Herefords and Short-horns. The subject was opened by Mr. Rhodes in a communication, stating that, for the purpose of settling in his own mind the question, "Whether the preference is to be given to the best Hereford cattle, or to the Improved Short-horns," he had the previous year made a journey from his residence near Leeds, to the north of England, and had then just returned from a journey of five hundred miles through Herefordshire and adjoining counties. It appears that in the latter journey he was accompanied by Mr. J. Whitaker, of Otley, then and for many years subsequently a well-known breeder of Short-horns. Mr. Rhodes is very careful to state that he makes the comparison between the Herefords and "the animals designated by the title of *Improved* Short-horns, which are few in number," and "not between the excellent breed of Herefordshire and the wretched cattle with *short horns*, which find their way, very undeservedly, into many parts of the South." In making this comparison Mr. Rhodes admitted that the "Herefords are more equal as a class than the Improved Short-horns," that "their offal is equally fine," that "they give a very good quality of meat," that "they breed well, and are hardy and healthy, but give very little milk."

In regard to the last mentioned properties, he does not claim much more for the Improved Short-horns, as he says: "They give a moderate quantity of milk, and do not propagate freely." He, however, gives the preference to the Improved Short-horns, chiefly on the ground of early maturity, saying that he had "every reason to believe that on the same food,

and in the same relative circumstances, the Improved Short-horns would be as good at two years old, as the Herefords at three." He, however, proposed a trial between the two breeds by placing half a dozen of each in the care of the same person, to be treated in the same manner, and adds: "If they were brought up here, I would give the Herefords their food, if they were the conquerors."

Mr. Smythies, in his reply to Mr. Rhodes, charges that the latter made but a partial examination of the Hereford cattle, and that hence his comparison is unfair, though making a puff for Mr. Whitaker's Short-horns, of which a sale was advertised in the same paper that contained Mr. R.'s communication. As to early maturity, he says: "Perhaps the Hereford may not be so large or so fat as a yearling, but ever after that he will be superior to the Short-horn." He offers the following:

"I hereby challenge Mr. Rhodes to show a Short-horned cow from any part of England, against a Hereford cow out of my own stock, that laid abroad last winter and ate nothing but straw till the latter end of February, in hopes to get her to stand to the bull. The cows to be slaughtered on the first of March; the heaviest cow to be the winner, for fifty guineas, provided the cow shown by Mr. Rhodes is as old as mine, 14 years; and that the acceptance of this challenge is announced to me within one week after this letter appears in your journal, and that the cow has not been more than one year feeding."

Mr. Smythies's letter was dated October 12, 1822. It does not appear that the challenge was accepted, or that any such trial as Mr. Rhodes proposed, took place. Twenty-seven years after this, viz: in 1849, several years after Mr. Smythies had closed business as a breeder, he was induced, in consequence of what he regarded as undue claims set up by some of the advocates of the Short-horns, to offer the following challenge through the Mark-Lane Express:

"I will show one hundred Hereford beasts which were the property of Sir Francis Lawley, on the 1st of January, 1849, and the same number which were the property of Mr. Aston,

of Lynch Court, on the same day, against an equal number which were the property of any two breeders of Short-horns or Devons in any part of Great Britain, on the same day, for one hundred sovereigns. I am willing to leave the decision to the three judges at the last Smithfield Show, two of whom are unknown to me, even by sight."

In connection with the above, Mr. Smythies made the following offer: "I am also ready to place four Hereford calves, on the 1st of May next, in the hands of any respectable grazier in the Midland counties, against four Short-horns and four Devons; no calf to be more than four months old on that day; the twelve calves to be turned to grass together, to have nothing but grass till the 20th of October following, then to be put into stalls, and to be fed as the grazier thinks proper, but the food to be weighed to each lot till the following May, when they shall be again turned to grass, and have nothing but what they get there till the first of October; then to be again taken into the stalls, and the food weighed as before; the whole to be shown as extra stock at the Smithfield Show, and after the Show to be slaughtered, the four beasts that pay the best to be the winners."

It does not appear that either of these propositions was ever accepted. In 1839 Mr. Price gave a public challenge to show twenty cows and a bull of his own breeding, against the same number of any one person's breeding, and of any breed—open to all England. The challenge was not accepted, though it gave rise to a correspondence through the Mark-Lane Express, between Mr. Price and the famous breeder of Short-horns, the late Thos. Bates, of Kirkleavington. We have not a copy of the correspondence at hand, but according to our recollection, Mr. Bates, in declining to accept Mr. Price's challenge, used similar language in regard to the Short-horns to that we have quoted from Mr. Rhodes. While admitting the superiority of the Herefords over the greater number of Short-horns, he thought there were some of the latter, though "only a few," which were preferable to the Herefords.

ACTUAL TRIALS BETWEEN THE HEREFORDS AND SHORT-HORNS.

There are but few records of actual trials between the Herefords and Short-horns. In Mr. Gibbs's extracts from the minutes of the Smithfield Club, it is stated that in 1825, "There was a sweepstakes between three Herefords belonging to the Duke of Bedford, and three Durhams belonging to the Rt. Hon. Charles Arbuthnot, won by the Herefords." No particulars are given.

Youatt, in his Treatise on Cattle, gives an account of an experiment which he says was "fairly conducted," as follows: "Three Herefords and three Short-horns were selected and put together in the straw-yard on the 20th day of December, 1827, and were fed in the open yard at the rate of one bushel of turnips per day each, with straw only, until May 2d, 1828, when their weights were taken and they were sent to grass; the Herefords weighed 23 cwt. 2 qrs., the Short-horns 27 cwt. On the 3d of November they were taken from grass and put into the stalls, when their weight was—Herefords, 33 cwt.; Short-horns, 38 cwt. 14 lbs. From that time until the 25th of March, the Herefords consumed 46,655 lbs. of turnips and 5,065 lbs. of hay; the Short-horns, 59,430 lbs. of turnips and 6,779 lbs. of hay. They then weighed—the Herefords 37 cwt. 14 lbs., the Short-horns, 43 cwt. 2 qrs.; being an increase of weight from the first weighing, of 2 cwt. 3 qrs. 14 lbs. in favor of the Short-horns; but they had, whilst in the stalls, consumed 12,775 lbs. more turnips and 1,714 lbs. more of hay. On the 30th of March they were all sold together at Smithfield, when the Short-horns fetched £97, the Herefords £96—being an overplus of only £1 to pay for the enormous difference in the food consumed, and the greater price given on account of the heavier weight of the Short-horns at the commencement of the experiment."

SIZE OF THE HEREFORDS.

The dimensions which have been given of some of the prize oxen of the Smithfield Club, show something of the bulk to which the stock attained in times past. But it has already been remarked that those oxen had generally been worked for several years before they were put to fattening, and that they were in most cases six or seven years old before they were slaughtered. The idea is entertained, to some extent, that the breed has diminished in size. It may be so, but it should be borne in mind that since the working of oxen has been chiefly discontinued, the steers have been fed with reference to their being turned for beef as soon as practicable, and that comparatively few are now kept beyond the age of three years. It has been seen that a comparatively small-boned animal would fatten earlier than a large-boned one. The breeding stock has therefore been selected in reference to this object, and the Hereford breeders now assert, apparently with truth, that their cattle will mature as early as any breed, when placed in similar circumstances. They attain, too, to very heavy weights from the great amount of flesh which they accumulate in proportion to the bone.

It is evident that some of the most noted breeders have not attempted to secure very large size. Thus, Mr. E. F. Welles, in his treatise entitled "A Guide to Form in Cattle," says of the herd of Mr. Knight, of Downton Castle, "they might be considered rather under the average size of the noted stocks of the country; but they were reared upon poor land, and he well knew—as descendents from his stock have often shown—that it did not require a large cow to breed a first-rate ox." By a "first-rate ox," Mr. Welles probably meant a profitable one to feed. Mr. Knight's were undoubtedly of this character. Mr. Duckham, in his lecture, states that they were dispersed over a large district of country, and obtained the name of the "Knight-grays;" that "they were smaller in size, more even and firmer in flesh" than the Tully-grays. The large and

valuable herd of the late Lord Berwick possessed, to a considerable extent, the blood of the Knight-grays.

It may be interesting to see the weights of some of the Hereford oxen of the olden time. The history of the Smithfield Club gives the dead weights of Mr. Westcar's oxen, exhibited at the show of 1802, as follows: The "cake-fed ox," four quarters, 1918 lbs.; tallow, 301; hide, 133—2352 lbs. The ox fed only on grass, hay and turnips, four quarters, 1806 lbs.; tallow, 204; hide, 122—2132 lbs. Mr. W.'s ox, exhibited at the show of 1803, four quarters, 1854 lbs.; tallow, 204; hide, 136—2194 lbs. We are informed through another authority, that Mr. Westcar's prize oxen for the years 1810, 1812, 1813, and 1814, weighed as follows—beef, tallow, and hide included: 2147 lbs.; 2059 lbs.; 1953 lbs.; 2141 lbs.

Mr. Duckham quotes from a correspondent who had been permitted to examine Mr. Westcar's books, an account of the sale of twenty Hereford oxen, from 1799 to 1811, which brought the aggregate sum of £2,123, or an average of £106 6s. each.

We have not the weights of many Herefords slaughtered of late years. Mr. Duckham gives that of the steer of Mr. Shirley, which won the Gold Medal at both Birmingham and Smithfield Club shows in 1859. His exact age was two years, six months, three weeks, and six days. His live weight was 1703 lbs., and his dead weight—understood to be beef only—1264 lbs. Mr. Duckham mentions that the live weight of the bull Cotmore (376), which took the first prize in his class at the first exhibition of the Royal Agricultural Society in 1839, was 3500 lbs. Mr. Dixon, whose name before occurs in this article, in a communication to the Mark Lane Express, speaks of the bull Silvius (1726) as having been slaughtered about Christmas, 1862, saying that "his carcass [beef only] pulled down the scale at twenty-one score the quarter"—equal to 1680 lbs.

In the year 1853, a four-year-old barren Hereford cow, owned by E. Corning, Jr., of Albany, N. Y., was slaughtered by James

Battersby, whose certificate of her weight was as follows: Live weight, 1710 lbs.; weight of carcass, 1245 lbs.; tallow, 140 lbs.; hide 94—1479 lbs. Leaving as shrinkage only 231 lbs.

Upwards of thirty years ago, Youatt, in his *Treatise on Cattle*, gave the weight of the Herefords sent to Smithfield market as from 50 to 70 score (1000 to 1400 lbs.) the four quarters. "A tolerable cow," he said, "will average from 35 to 50 score,"—700 to 1000 lbs.

Compared with the Short-horns, the Herefords are larger in the chest and more full in the first ribs, which gives them a comparatively large girth. The following are the measurements of the prize bulls of the two breeds at the Warwick meeting of the Royal Agricultural Society. The animals received prizes in the order in which they are here placed:

SHORT-HORNS.			HEREFORDS.		
<i>Class I.</i>			<i>Class I.</i>		
AGE.		GIRTH.	AGE.		GIRTH.
1.	4 years, 1 week, 4 days.....	8 ft. 6 in.	1.	2 years, 10 months, 1 week.....	8 ft. 5 in.
2.	4 years, 8 months, 3 weeks.....	8 ft. 6 in.	2.	4 years, 6 months, 1 week.....	8 ft. 7 in.
2.	2 years, 7 months.....	7 ft. 7½ in.	3.	2 years, 10 months, 4 weeks.....	8 ft. 0 in.
<i>Class II.</i>			<i>Class II.</i>		
1.	1 year, 10 months, 2 weeks....	7 ft. 7 in.	1.	1 year, 9 months, 3 weeks.....	7 ft. 8 in.
2.	1 year, 8 months, 1 week.....	7 ft. 2 in.	2.	1 year, 11 months, 1 week.....	7 ft. 5 in.
3.	1 year, 11 months, 1 week.....	7 ft. 4 in.	3.	1 year, 9 months, 2 weeks.....	7 ft. 1 in.
<i>Cows in Milk or in Calf.</i>			<i>Cows in Milk or in Calf.</i>		
1.	4 years, 3 months.....	8 ft. 0 in.	1.	3 years, 7 months.....	8 ft. 1 in.

These measurements were taken by Mr. Duckham, the editor of the Hereford Herd-Book. The writer of this article, however, measured several of the animals. The Hereford cow whose girth is given is Mr. Rea's *Bella*. Her portrait will be found in the fifth volume of the Herd-Book. The writer carefully compared her girth with that of the largest Short-horn cows on the field, and she excelled them all.

Mr. Robert Smith, the steward of the cattle classes at the combined meeting of the Royal and Highland Agricultural Societies, at Battersea, in 1862, reported the measurements (girth) of nearly all the cattle exhibited on that occasion, and

from his report the following is taken, the animals being placed in the order in which they received prizes:

SHORT-HORNS.			HEREFORDS.		
<i>Bulls.</i>			<i>Bulls.</i>		
AGE.		GIRTH.	AGE.		GIRTH.
1.	3 years, 3¼ months.....	8 ft. 4 in.	1.	3 years, 11¼ months.....	8 ft. 4 in.
2.	3 years, 7½ months.....	8 ft. 8 in.	2.	5 years, 9¼ months.....	8 ft. 1 in.
3.	4 years, 5½ months.....	8 ft. 4 in.	3.	4 years, 11 months.....	8 ft. 9 in.
<i>Cows.</i>			<i>Cows.</i>		
1.	3 years, 1½ month.....	7 ft. 10 in.	1.	6 years, 5¼ months.....	8 ft. 1 in.
2.	3 years, 5¼ months.....	7 ft. 8½ in.	2.	6 years, 4¼ months.....	7 ft. 8½ in.
3.	3 years, 5¼ months.....	— —	3.	5 years, 11¼ months.....	7 ft. 10 in.

POINTS OF THE HEREFORDS.

The general form of the Herefords seems to have been improved of late years. From all the information attainable, there was a period when many of the breeders were rather indifferent in regard to the shape of their animals, looking almost entirely to tendency to fatten. It was this neglect of form which seems to have induced Mr. Welles, in 1849, to write his "Guide to Form in Cattle," and the accompanying remarks on color, form, and breeding. Mr. W.'s opportunities for studying the various breeds of cattle were quite extensive, and his judgment was such that he was frequently consulted by breeders of different varieties, in regard to questions connected with breeding. He was intimate with the Rev. Henry Berry, the well-known historian of the Short-horns, and assisted that gentleman in the formation of his noted herd of that breed. He was well acquainted with the leading herds of Yorkshire and Durham, as well as with choice herds of Devons and Long-horns. He was for many years a breeder of Herefords and Argyles, or West Highlanders. He was a close observer of the breeding system of John Price, from whom, he says, he derived most of his knowledge of cattle, and to whom, he thinks, the breeders of Herefords are much indebted for improvements in the breed in respect to form and other properties. Mr. Welles commenced his remarks on form as follows :

"There is, unfortunately, for the improvement of Hereford cattle, too little attention paid to the true principles of form—an object which the late Mr. Price long and unceasingly pursued; and it must be regretted that it is not more appreciated in the native county of the breed,—the breeders generally contenting themselves with the possession of a few points which they consider all-important, and which give the animal a striking appearance to common observers, without, however, that proportion of parts which it is so desirable to obtain." The points which he thought were receiving less attention than they deserved, were the chest and the ribs which enclose it,—more capacity being required. Too soft a touch was, in some cases, unjustly preferred to one moderately firm and elastic. An animal standing high, from the length of its legs, is too frequently tolerated without corresponding depth and width of frame. Too little attention was given to the underline of the body. "No animal," he says, "can be called complete in form, in which the under points are not as well furnished as the upper, and yet how often we see a striking disproportion.

"The shoulders in Hereford cattle are liable to but little objection, being for the most part free from bareness along the front of the shoulder-blade, and from any unnecessary projection of bone at that part called the shoulder-point. The position of the blade will, of course, vary in obliquity; when that is sufficient, the upper part of the blade will be better united with the chine, and the kernel before the shoulder larger and more developed. The circularity of the pectoral ribs is also greater, with such position of the shoulder-blade, and the fore-flank more prominent. In many specimens of good Herefords, the neck is placed low in reference to the shoulder, and the head is carried downward in consequence. In cattle as well as sheep, this form is often accompanied by a fullness of the chine, but it is disadvantageous to an animal when in a pen with others that carry their heads higher. Many of Mr. B. Tomkins's and Mr. Price's had this growth, and I never heard it objected to on any other grounds." The setting of the head

abruptly to the neck, the junction of those parts being thin and narrow, is objected to as "an indication of too great delicacy, and consequently to be avoided."

In regard to the general properties to which the breeders of Herefords should direct their attention, Mr. Welles remarks as follows: "It is allowed on all hands, I believe, that the properties in which the Herefords stand pre-eminent among the middle-sized breeds, are in the production of oxen, and their superiority of flesh. On these points there is little chance of their being excelled. It should, however, be borne in mind that the best oxen are not produced from the largest cows, nor is a superior quality of flesh such as is considered very soft to the touch, with thin skin. It is the union of these two qualities which often characterizes the Short-horn; but the Hereford breeders should endeavor to maintain a higher standard of excellence,—that for which the best of the breed have always been esteemed,—a moderately thick, mellow hide, with a well-apportioned combination of softness with elasticity. A sufficiency of hair is also desirable, and, if accompanied with a disposition to curl moderately, it is more in esteem; but that which has a harsh and wiry feel is objectionable.

"It is generally admitted that the male, having the most influence on the character of the offspring, should be as complete as possible, and if the herd is extensive, it cannot be expected that one bull will suffice to establish and maintain a good stock. The bull and cow should be suited to each other, as far as is consistent with human foresight and judgment; and besides, the bull being selected of a family which has been in repute for good steers, he should also conjoin with that recommendation, purity of blood, and if the herd of cows has been selected without any particular reference to that distinction, it is still more important that his descent should have as little stain as possible. * * * I should remark, also, that the size and qualities of the *family* of the male are of more importance than his own appearance, and that a small male descended from large parents is more likely to produce

stock of competent size than one himself having a larger frame, but descended from a smaller-sized family.

"It must frequently have occurred to those who have given close observation to the breeding of animals, that sometimes the produce, if unpromising in many points when young, assimilates in after age more to the right standard of form and quality; but this can only be calculated on in well-bred animals, in that acceptance of the term which implies a succession in the family of good animals, and with no unbefitting mixture of blood.

"It is too often the case that when a young bull has been used for two or three years in the same stock, he is got rid of,—perhaps slaughtered,—however good for stock he promises to be. This I think is injudicious, for two reasons: First, that the stock can hardly be sufficiently proved at so early an age; and secondly, that if the bull turns out a first-rate stock-getter, he will be eagerly enough sought after, as that distinction belongs to but few. Many a good bull is thrown away from too hasty a decision; and, on the other hand, there are far too many bulls reared from cows of very inferior pretensions."

It should be understood that Mr. Welles's remarks in regard to oxen and steers have reference to those animals chiefly as fattening stock, they being seldom used for labor in England of late years.

Mr. Duckham's summary of a first-class Hereford of the red white-faced color is as follows: "The horns of a yellow or white waxy appearance, frequently darker at the ends; those of the bull should spring out straightly from a broad, flat forehead, whilst those of the cows have a wave, and slight upward tendency. The countenance is at once pleasant, cheerful, and open, presenting a placid appearance, denoting good temper and that quietude of disposition which is so highly essential to the successful grazing of all ruminating animals; yet the eye is full and lively; the head small in comparison to the substance of the body. The muzzle white, and moderately fine,

cheek thin. The chest deep and full. The bosom sufficiently prominent. The shoulder-bone thin, flat, and sloping towards the chine, well covered on the outside with mellow flesh; kernel full up from the shoulder-point to the throat, and so beautifully do the shoulder-blades bend into the body that it is difficult to tell, in a well-fed animal, where they are set on. The chine and loin broad; legs straight and small. The rump forming a straight line with the back, and at a right angle with the thigh, which should be full of flesh down to the hock, without exuberance; twist good, and well filled with flesh even with the thigh. The ribs should spring well and deep, level with the shoulder-point; the flank full, and the whole carcass well and evenly covered with a rich, mellow flesh, distinguishable by its yielding with a pleasant elasticity to the touch. The hide thick, yet mellow, and well covered with soft, glossy hair, having a tendency to curl."

THE HEREFORDS AS WORKERS.

From reference already made in this article to the specifications in regard to premiums offered by the Smithfield Club, it will be understood that the Herefords were formerly much used in England for the yoke. In fact, the Club at one time required that *all* the competing oxen above a certain weight should have been worked. Thus, in 1806, when the oxen and steers were divided into six classes, viz: Herefords, Long-horns, Short-horns, Sussex or Kent, Devons, and Cross-breeds, it was specified that "The animals exhibited for the above premiums must have worked at least two years ending the 1st of January, 1807, and must not have been put to fatten previous to that day." But for the three following years, it appears that no Short-horned or Long-horned oxen were exhibited, except one Short-horn, in 1808, which was disqualified. It is probably fair to infer that the exhibitors of animals of these breeds objected to the requisition in regard to work, for in 1810 it was decided "That the condition respecting Long-horned and Short-horned oxen having been worked, be dispensed with."

Most of the Hereford oxen which received prizes from the Club, for many years from its first exhibition, had undoubtedly performed more or less labor.

But the increasing demand for beef and its high price gradually brought in the horse as a substitute for the ox in farm work, in England, and now the horse is in turn being displaced by steam. So long as oxen were worked, there is no question that the Herefords were considered very valuable for the yoke. Mr. J. M. Read, of Elkstone, near Cirencester, England, informed the writer that for many years he worked constantly about twenty Hereford oxen on his farm; that he several times tried them in comparison with those of other breeds. He found them more active and more hardy than the Short-horns, and able to do more work. He gave the preference to the Herefords over all other breeds, and continued to use them till, a few years since, he adopted steam cultivation.

In this country very few full-blood Herefords have been worked. Many half-bloods, and occasionally some of a higher grade, have been used in farm labor, and they proved so well that, when offered for sale as working oxen, they brought the highest prices. George Clark, of Springfield, Otsego county, N. Y., who has been breeding full-blood and grade Herefords for many years, and who on one occasion showed fifty head of the grade stock at an exhibition of the New York State Agricultural Society, states that he tried the half and three-fourths-bred oxen in comparison with horses at the plough, and that the oxen did as much work as the horses, except in very hot weather.

THE HEREFORDS AS MILKERS.

On this point the Herefords have suffered great injustice in reference to comparisons with other breeds, especially the Short-horns. The *unimproved* Short-horns, or those which have not been bred particularly for beef, undoubtedly give, when well fed, large quantities of milk; but the *Improved* Short-horns, in which the fattening propensity is the leading

characteristic, are at best only moderate milkers. They are in reality as different from the milking Short-horns as though they were of different breeds. No one would think it fair to compare the milking Short-horns with the Herefords for *beef*, and it is, of course, equally unfair to compare the Herefords with the milking Short-horns for *milk*, under the pretence that it is a proper test of the two breeds in general. The only fair test, obviously, would be to place the Herefords with the beef-making Short-horns, and then see if the latter, with equal tendency to fatten, give more milk, or produce more butter, than the Herefords.

The fact is, that no cattle in which the fattening tendency is developed in the greatest degree will at the same time excel in the production of milk. The remarks of the noted Hereford breeder, Mr. John Price, on this subject, are worthy of notice. In a communication published in the *Farmer's Magazine*, January, 1841, he said: "Experience has taught me that *no animals*, possessing form and other requisites giving them a great disposition to fatten, are calculated to give much milk; nor is it reasonable to suppose they should; it would be in direct opposition to the laws of nature. Had I *willed* it twenty years ago, my belief is that I could by this time have bred twenty cows, purely from my own herd, which would have given a sufficient quantity of milk for *paying* dairy purposes; and I am equally confident that in the same period I could have bred a similar number that would not at any time have given twenty quarts of milk a day *among them*. I feel confident that I could effect either of these objects more easily and certainly than I could blend the two properties in the same animal,—retaining also the form and quality best calculated to live hard and feed" [fatten].

At the first exhibition of the English Royal Agricultural Society, in 1839, a prize of fifteen sovereigns was offered for the cow "best calculated for dairy purposes"—the competition being open to all breeds in the kingdom. This prize was taken by the Rev. J. R. Smithies, for a Hereford. The second prize

was awarded to a Short-horn. Several other Herefords were entered for the prize; a circumstance which proves that cows were to be had of this breed, in the dairy qualities of which their owners had such confidence as to show them against any others. This was the only occasion on which the Royal Society has brought the different breeds into competition with each other, the class having been from that time abolished.

Mr. Smythies, in a communication to the Mark Lane Express, Feb. 5th, 1849, discussing the merits of the Herefords as milkers, said: "I have seen Hereford cows milk well, and had one myself which made eleven pounds of butter a week for three months." This may have been the cow on which he received the above-mentioned prize, though this is not stated. But he observes that beef is much more profitable in his section than dairy products, and that on this account "it is not an object with the Hereford breeders to have good milkers." This is undoubtedly the fact, and it explains why Hereford breeders have not paid more attention to milking properties in their cattle. Mr. Duckham, in his lecture, says that in the dairy counties, where the milking properties of the cow are well attended to, the most satisfactory results are realized. He quotes from a letter of Mr. Read, to whose experience with the Herefords as workers reference has been made, the statement that "they have been used for dairy purposes for nearly half a century upon the farm," and that he believes they yield a larger return than could be obtained from any other breed upon a similar class of land.

Mr. Duckham also quotes from a letter of Mr. Mappowder, of Dorsetshire, whose herd of Herefords has been formed thirty years. He states that the stock has much improved since he obtained it, and that "Hereford dairies are becoming very common in the country." He adds: "In proof that they are good for milk, we let nearly 100 cows to dairy people, and if I buy one of any other breed to fill up the dairy, they always grumble, and would rather have one of our own bred heifers. We let our cows at so much per year, finding land

and making the hay." Mr. D. also quotes from a Cornwall correspondent, who says that according to his experience the Herefords are good milkers, and that he is convinced that when the cows are deficient in their yield of milk, "it does not arise from any constitutional defect, but rather from mismanagement in rearing, or a deficiency of the constituents essential to the production of milk in their food. My cow 'Patience,'" he continues, "bred by Mr. J. Y. Cooke, Moreton House, Hereford, has this summer given 14 lbs. of butter per week; and 'Blossom,' bred by the late Mr. Langmore, Salop, gave 22 quarts of milk, yielding $2\frac{1}{2}$ lbs. of butter per day,"—equal to $17\frac{1}{2}$ lbs. of butter per week. The same correspondent says: "I consider the Herefords are peculiarly adapted to this humid, fickle climate, where Devons become small and delicate, and Short-horns grow bony and coarse. When grazed upon the granite moors, I have invariably found them do better than the Devons when running together. I rear my calves on skim milk."

THE HEREFORDS IN AMERICA.

There have been comparatively few importations of Herefords into this country. The first of which we have any account was that of the late Hon. Henry Clay, of Kentucky, consisting of two bulls and two heifers, imported in 1817. It is at least doubtful whether they were of the most esteemed families of Herefords. In an account of them, written by Mr. Clay for the *Baltimore American Farmer*, in 1822, he stated that the price paid for the four, in England, was £105 sterling. It would naturally be inferred from this that they were not from a herd of the highest repute. Mr. Clay states that one of the bulls died on his journey from Baltimore to Kentucky, and it is understood that the increase from the other was not large.

In 1824, Admiral Sir Isaac Coffin, of the Royal Navy, a native of the island of Nantucket, presented to the Massachusetts Society for Promoting Agriculture, a Hereford bull and heifer. They were bred by Sir J. G. Cotterel, whose stock was from Mr. Yarworth, and his from Benj. Tomkins, the first noted

breeder of Herefords. The heifer never bred. The bull left a valuable progeny of half-bloods, particularly in the vicinity of Northampton, where he was kept for several years by the late Hon. I. C. Bates. The cattle-feeders along Connecticut river stated that after they had fed some of the half-blood Hereford oxen, they would gladly pay from five to ten dollars a head more for them than for other cattle of equal size and condition, knowing that they would be amply remunerated for the additional cost, in the gain the animals would make for the food consumed, and in the extra price the beef would bring.

In 1840, Corning & Sotham, of Albany, N. Y., imported seventeen cows and heifers, and five bulls. They were from the herds of Mr. J. Hewer and Mr. Walker. A portion of this herd finally passed into the hands of Mr. E. Corning, Jr., who added to it by importations of several fine animals from the herd of Rev. J. R. Smythies, and subsequently others from different herds. Probably the breed has been more disseminated through the country from these importations than from any others.

About the year 1852, the Hon. L. A. Dowley, then residing at Brattleboro, Vt., imported a bull and two heifers. They were from the herd of the late Lord Berwick. The progeny of these animals was scattered up the Connecticut Valley, somewhat, and in a few instances went into Lower Canada. The bull Cronkhill, a very fine animal, passed into the hands of George Clark, of Springfield, Otsego county, N. Y.

There are on the island of Jamaica one or more pretty large herds of Herefords. The names of the owners are not now at hand. We learned from the agent of the owner of one of the herds, a few years since, that it consisted of 150 head; that the oxen were used for labor, for which they proved very valuable, and that the stock also did well for other purposes. He stated that the preference had been given to the Herefords, after trials with various breeds.

But the stock which has latterly attracted most attention, with us, is that of the importation of Fred. Wm. Stone, of

Guelph, Province of Ontario. The imported animals were from the herds of the late Lord Berwick and Lord Bateman. The first importation was made in 1860. The herd now consists of about fifty head, and many sales have been made from it by which various other herds have been started. Mr. Stone keeps both Herefords and Short-horns. He gives the Herefords the preference as grazing stock, and some experiments, which have been made on one of his farms, show that the Herefords give quite as much milk as the Short-horns, while it excels that of the latter in richness.

THE HEREFORDS IN MICHIGAN.

In 1858, N. P. Stewart, of Pontiac, bought of Erastus Corning, Jr., of Albany, N. Y., five heifers and a bull. Edwin Phelps, of Pontiac, bought a part of Mr. Stewart's herd, and in 1866 purchased two cows from Mr. Corning. He has bred from this stock without intermixture, but does not state, in giving the above information, of how many animals his herd now consists.

Ex-Governor Crapo, of Flint, purchased of Mr. Stone, of Guelph, Ontario, in 1868, a bull and three heifers.* In regard to the manner in which this stock has succeeded since its introduction into Michigan, Gov. Crapo writes, under date of December 10, 1868, as follows:

*As the pedigrees of these animals are duly authenticated, they are herewith given:

BULL.—VELVET JACKET—Red, with white face. Calved October 14, 1866. *Sire*—Guelph (2023). *Dam*—Verbena, imported, by Carlisle (923). *Gr. dam*—Flower, by Radnor. *Gr. gr. dam*—Old Fancy, bred by the late Mr. Galliers of Shobden, Herefordshire.

HEIFERS.—GENTLE, 7th—Red, with white face. Calved August 23, 1866. *Sire*—Guelph (2023). *Dam*—Gentle 2d by Golden Horn (2015). *Gr. dam*—Gentle, imported, by Carlisle (923). *Gr. gr. dam*—Lady, by Knight (185). *Gr. gr. gr. dam*—by Monarch (594). *Gr. gr. gr. gr. dam*—bred by the late Mr. Turner of Noke Court.

BONNY LASS 3d—Red, with white face. Calved May 27, 1866. *Sire*—Imported Patriot (2150). *Dam*—Bonny Lass, imported, by Carlisle (923). *Gr. dam*—Little Beauty, by Andrew 2d (619). *Gr. gr. dam*—Dainty, by Vulcan (1446). *Gr. gr. gr. dam*—bred by the late Mr. Turner of Noke Court.

BONNY LASS 4th—Red with white face. Calved April 18, 1867. *Sire*—Imported Patriot (2150). *Dam*—Bonny Lass, imported, by Carlisle (923). *Gr. dam*—Little Beauty, by Andrew 2d (619). *Gr. gr. dam*—Dainty, by Vulcan (1446). *Gr. gr. gr. dam*—bred by the late Mr. Turner of Noke Court.

"The Herefords have done extremely well, in fact, they could hardly have done better. They have had no more than ordinary fair keeping, and yet they are in prime condition, and their coats are very fine. I have little doubt that the Herefords will yet be *the stock* for Michigan. They are docile and hardy, besides being very easy keepers; and I have no doubt will stand a long, severe winter, and come out ahead of the Short-horns in the spring, on two-thirds the cost of keeping. I am highly pleased with them, and shall increase the number of my herd as rapidly as possible, being confident that as soon as their merits are known they will be appreciated. There is now almost a mania through the country in favor of the Short-horns, which I am free to admit are a noble and valuable breed of cattle; but they are adapted to the luxuriant pastures and milder climate of Kentucky, rather than to Michigan. You have seen my Hereford bull Velvet Jacket, and my Short-horn bull Lucifer, both about the same age,—a little over two years. Now, I am obliged to feed my Short-horn nearly twice the grain, &c., that I do the Hereford to keep him in equally good condition. The Short-horns are undoubtedly a valuable breed from which to procure grades by crossing with our native or common stock, where meat is the object; but for a thoroughbred race of cattle, I have no doubt that, in Michigan, the Herefords will prove unrivaled. I intend, however, to give the Herefords, Short-horns, and Devons a fair trial, both as full-bloods and grades, if my health will permit me to carry out my original plan."

It is proper to state that Gov. Crapo has, besides the Short-horn bull which he mentions, several Short-horn cows, and some Devons, on his different farms, and has rare facilities for making trials with the several breeds.

ILLUSTRATIONS.

The engraving which forms the frontispiece to this volume is a good likeness of the Hereford bull, Sir Benjamin, whose pedigree is as follows: Red, with white face. Calved March

21st, 1865. Bred by Frederick Wm. Stone, Moreton Lodge, Guelph, Province of Ontario; the property of Wm. Perdue, Chinguacousy, Ontario. Got by Guelph (2023); dam Graceful, by Severn (1382); gr. dam Lady, by Albert Edward (859); gr. g. dam Zephyr, by Walford (871); gr. gr. g. dam Friday 2d, by Wonder (420); gr. gr. gr. g. dam Friday, by Commerce (354); gr. gr. gr. gr. g. dam Pretty Maid, by the Sheriff (356); gr. gr. gr. gr. gr. g. dam bred by Mr. Tuberville, by Old Sovereign (404).

Sir Benjamin has taken the following prizes, viz: The first prize in his class at the Provincial Agricultural Exhibition at Toronto, in 1866; the same at the exhibitions of the same association, at Kingston, in 1867; and at Hamilton in 1868, at the latter of which he was also awarded the Diploma for the best Hereford bull of any age.

The engraving facing page 187 was copied from the picture of the Hereford cow Carlisle, in the fifth volume of the Hereford Herd-Book. She was bred by the late Lord Berwick, and purchased of him by Mr. Duckham, editor of the Herd-Book, when she was four years old. She was got by Albert Edward (859), dam (Silver) by Emperor (221). She was a winner of the first prize in her class at the exhibitions of the Royal Agricultural Society at Carlisle, Chelmsford, and Salisbury. She was a cow of extraordinary substance and symmetry, to which it is impossible to do full justice with the pencil. Still, having not only seen but *studied* the animal herself, we may pronounce the engraving a fair portrait. Mr. Duckham, in a late letter, says: "I fed and slaughtered Carlisle, with other grand old breeding cows, during the late visitation of the cattle-plague, or rinderpest, which put a stop to all kinds of cattle-traffic, and was a serious loss to me and to the nation at large." The produce of Carlisle consisted of seven bulls, viz: Eagle, Emperor, Garibaldi, Commodore, Lord Clyde, Rob Roy, and Reginald; and one heifer, Silver.

INCREASE OF THE HEREFORDS.

Extracts from a letter of Mr. Duckham, dated Baysham Court, Ross, Herefordshire, November 26, 1868: "The Herefords are steadily increasing in England and Wales. They are also gaining favor in Ireland and Scotland—particularly in Ireland—and even many of our Short-horn breeders buy Hereford steers to graze. * * * As compared with the Short-horns, I am not aware that any difference exists in their early maturity, under a similar system of feeding. What I claim for the Herefords is, that they are more hardy than the Short-horns, that they will live where the Short-horns will starve, and that they will return a greater quantity of animal food for a given quantity of vegetable. I do not see that I can add anything of particular interest respecting the Herefords, to what is contained in my lecture, to which you refer. This, however, has been proved, and it suggests itself to the mind in looking at animals of the two breeds, viz., that a Hereford cow, say ten or twelve years old, is usually as fine in her offal as a heifer, whilst a Short-horn cow of that age presents a very different appearance."

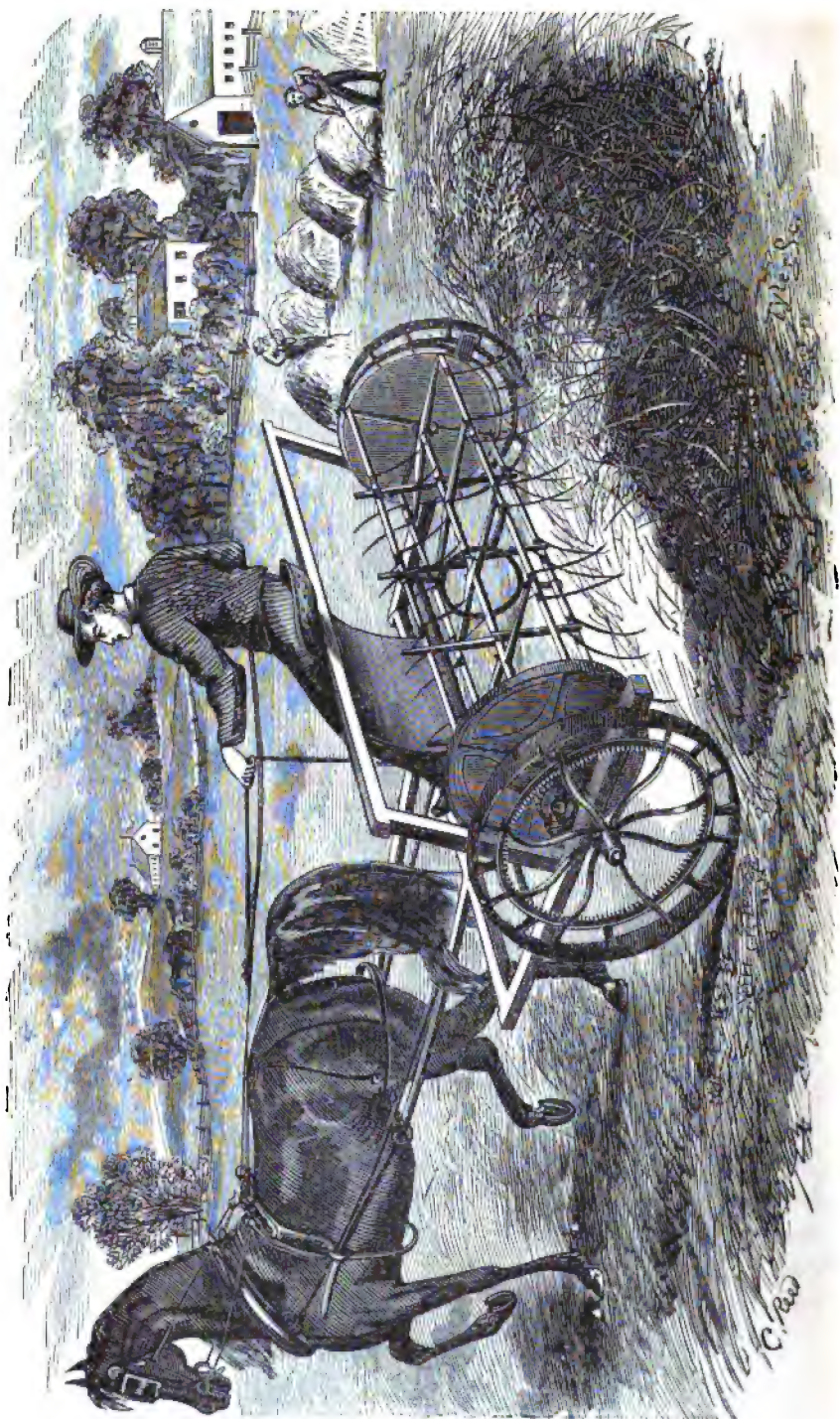
N. B.—Since the preceding portion of this paper was prepared, accounts of the Birmingham and Midland Counties Show of fat stock, and of the Smithfield Club Show, held in December, 1868, have come to hand. They show the relative standing of the Herefords to have been highly satisfactory to their breeders. At the show of the Smithfield Club, the gold medal for oxen and steers was awarded to a Hereford, four years and three months old, bred by the late Mr. Elsmere, and fed by the well-known Mr. Heath, of Ludham, Norfolk. The Farmer's Magazine pronounces this animal "one of the grandest beasts at all points ever exhibited. Of great size [weighing 2,536 lbs.] and breadth, with an upstanding, commanding appearance, a noble, handsome head, and long, deep frame, this animal has also fed capitally, and is as good to the hand as to the eye."

But the standing of the Herefords at either of these shows was by no means dependent on this animal, fine as he may have been. The journal from which we have quoted above, says: "Almost generally indifferent as were the Short-horns, so almost generally good were the Devons, Herefords, and Cross-breeds. The judges occasionally commended whole classes; and they might have gone on to generally commend the two breeds of Devons and Herefords, so little was there inferior, and so much was there so good. * * * Weight for weight, as well as for looks, level feeding, and character, the Hereford beat the Short-horn." In explanation of the relative merits of the Short-horns, Herefords, and Devons, the same journal says: "The excuse [of the advocates of the Short-horns] is, that all the promising Short-horn bull-calves are retained for use in the herd; but, considering how many high-bred Short-horn heifers are prepared for the sacrifice, any such explanation cannot have much weight; and, of course, the champions of other sorts might advance precisely the same argument." Referring to the subject in another place, it is said: "If the highly-bred Short-horn steer will not feed, and the long-pedigree Short-horn cow will not breed, as would seem to be the result arrived at by these more recent exhibitions, where are we to look for any special excellence? Where the return in meat or milk? It has recently been said of the one or two thousand guineas occasionally given for a yearling colt, that 'there is a deal of *flash* about this kind of thing.' Has there not been a good deal of *flash* also about the Short-horn market?"

Mr. Duckham, editor of the Hereford Herd-Book, who was one of the Stewards of the late Smithfield Show, writes, under date of February 27th, that he aided in weighing every animal exhibited. He says: "The Hereford oxen and steers averaged heavier than any others, as you will see by the following tabulated statement:

UNDER 2 YRS. 6 MOS.	UNDER 3 YRS. 3 MOS.	EXCEEDING 3 YRS. 3 MOS.
6 Devons.....1296 lbs.	11 Devons.....1488 lbs.	17 Devons.....1646 lbs.
3 Herefords.....1781 lbs.	8 Herefords.....1936 lbs.	9 Herefords.....2238 lbs.
4 Short-horns.....1648 lbs.	12 Short-horns.....1976 lbs.	14 Short-horns.....2220 lbs.

"It is a rather remarkable fact, that the Gold Medal ox of 1868 was got by the same bull, and fed by the same person, as the Gold Medal ox of 1863. I used the sire for three seasons."



THE AMERICAN HAY-TEDDER.

THE use of the hay-tedder is to hasten the curing of hay. It was used many years in England before mowing-machines were introduced, but was not much used in this country till the scythe had, to a great extent, been superseded by various machines. Taken on the swathes left by the scythe, the tedder distributes the cut grass evenly over the ground, and in a condition to dry rapidly. It was argued that the tedder could not be used with as much advantage in connection with the mowing-machine as with the scythe, on account of the more even and lighter condition in which the machine left the grass. The position seems not unsupported by reason; but practice has demonstrated that there are important advantages in the use of the tedder for machine-cut grass. In many instances—especially in clover, and in all cases where the burthen is very heavy—the tendency of the machine is to gather the crop into masses too compact to dry rapidly. A good tedder distributes these masses as it would ordinary scythe-s swathes.

Again, the benefits to be derived from the tedder are not confined to simply spreading the green hay by once going over the field. Every farmer of observation knows how much faster his hay will make by *turning*. The second and subsequent operations of the tedder are similar in effect, though better, than so many turnings; they move the hay in such a manner that the air passes through it, and in doing so, carries off the moisture it contains. The result, of course, is a shortening of the time required to make grass into well-cured hay; thus les-

sensing the risk of damage by unfavorable weather, and also lessening the expense of the curing process.

Another important consideration connected with the use of the hay-tedder and other improved hay-making implements and machines, is, the means afforded of rendering the crop more valuable in the aggregate, on account of its superior quality. The period in which clover and the grasses are in the condition for making the best hay is very short. Before this period arrives the herbage is too watery, and afterwards it is too woody. To secure in the hay the greatest amount of nutriment, it must be cut and cured just in the "nick o' time." Anything which facilitates the process of curing adds, obviously, to the value of the crop, by rendering its quality better.

Before the introduction of mowing-machines, horse-rakes, and hay-tedders, it was impossible to secure but a small proportion of the hay crop at the proper time. When the scythe only was used for mowing, the farmer was obliged to make a sort of compromise, by cutting a part of the crop too early, and the rest (generally the larger part) too late. By the modern appliances, the season of hay-making is greatly shortened, and a much larger portion of the crop is cut at the right time. The tedder is certainly entitled to no small share of the credit in the attainment of this result.

The "American Hay-Tedder" differs in construction, somewhat, from any other. It was tried the past season on the farm of the State Agricultural College, in all the various circumstances in which such a machine would be required, and performed the work satisfactorily. Even in heavy, lodged clover, where much advantage from the use of a tedder was hardly expected, it divided the tangled bunches left by the mowing-machine, so that the crop was evenly and lightly distributed over the ground, and that, too, without breaking off the heads of the clover, or breaking the stalks.

The practice of curing clover hay chiefly in cock is a very good one, especially where *hay-caps* are used. It has been doubted whether the use of the tedder would be advantageous

on clover which it was designed to cure in this manner. But experience proves that if the tedder is used at the right time, or before the clover gets so dry that the leaves and heads will crumble off under its operation, it will be an advantage by hastening the time when the hay may be put in cock. It was the opinion of the superintendent, that, in all other cases, the use of the tedder saved at least a day, on the average, in the time of curing each lot of hay cut upon the farm.

The American Hay-Tedder is manufactured by the Ames' Plough Company, Boston, Mass.

DAIRY PRODUCTS.

THE season can hardly have been considered very favorable for the production of milk, on account of the extreme dryness of July and August. The unusually high degree of heat for July was also a detriment to the manufacture of both butter and cheese. Messrs. Baker & Son, proprietors of the Fairfield (Lenawee county) Cheese Factory, write: "July was the worst month for dairy products that we ever experienced. The milk for that month made but a small amount of cheese, and that of inferior quality."

The hot weather, undoubtedly, operated in reference to the production of good butter as unfavorably as in reference to cheese. In fact, without better facilities for butter-making than are provided on most Michigan farms, it was impracticable to make butter which could be called good. Inducements to attempt the production of better butter than is generally offered in the markets of this State, are latterly very much increased; and, indeed, as cheese-making is advanced, the tendency must be to enhance the price of butter, or to make the relative profits of butter and cheese more in favor of the former.

Under these circumstances, it would seem to be the part of wisdom for persons who are favorably situated for making butter, to endeavor to make that of the best quality, which, from the higher price it would command, would render its production much more remunerative. The construction of spring-houses will be found most advantageous, wherever running spring water can be obtained in sufficient quantity, in proper situations. Such structures will afford, in many

instances, nearly all the requisites of a milk-room, especially the securing of a uniform temperature of the milk by the vessels which contain it being constantly surrounded with a current of cold water. Although such situations are not as common in this State as in some other sections, they are occasionally met with,—sometimes on the best land for dairy purposes.

It is, perhaps, not improbable that the system of "butter-factories," first organized in Orange county, N. Y., and subsequently adopted to some extent in other counties of that State, may be introduced into Michigan. Or, instead of that, the plan of combining the manufacture of butter and cheese, as is done by Mr. White, at his establishment at Ceresco, may be adopted. (See Report of 1867, pp. 141, 147.) Mr. White's system secures all the advantages of butter-making which are afforded by any other. It, however, necessarily involves more expense than farmers in general can afford. But the same principle applies here as to cheese-making on the factory system. Combination of capital and interests secures advantages which could not otherwise be realized. Mr. White has demonstrated the practicability of the plan. His operations for the past season were quite as satisfactory as previously. The experience of the unprecedented heat of July fairly proved that no hindrance may be expected to occur to the production of butter in the usual quantity, and of the highest quality, from any similar extreme of temperature. Mr. White's butter has at all times commanded the highest price, and has been disposed of to applicants from the Eastern cities, St. Louis, and intermediate points. When visiting the factory in October, we were informed by the superintendent, Mr. Durkee, that the temperature of the milk-room had varied but very little during the season, and that through the great heat of July, the cream rose well. We have not the statistics of the factory for 1868.

The cheese factory of Rufus Baker & Son, Fairfield, Lenawee county, according to a statement furnished by the proprietors, received the past season the milk of 600 cows. The whole quantity of milk delivered at the factory was 2,299,629 lbs.

The amount of cured cheese made was 233,231 lbs. The quantity of milk required for a pound of cured cheese was 9.86 lbs. The average price per hundred of cheese sold was \$15.24. The net returns to patrons for 1,000 lbs. milk were \$13.45 $\frac{3}{4}$. The price charged for making cheese was \$1.25 per 100 lbs.

Mr. Baker, Sr., writes that the average weight of cheese per cow from the six hundred cows, whose milk was brought to the factory, was a trifle less than 400 lbs.; that the most cheese made from any one herd was an average of 500 lbs. per cow, giving a cash return of about \$65 per cow. Several herds, it is stated, ran as low as 300 lbs. per cow, giving a net return of about \$39. In regard to this great discrepancy, Mr. Baker remarks that "good care pays largely in excess of poor care." The figures of the case are certainly suggestive, for, while the cows which yielded a net return of \$65 each were probably a source of profit to their owner, it is not unlikely that the others were merely an expense. The *moral* of the case is, if profit is expected from animals, they must be well fed and cared for.

The price of cheese at the close of the year 1867 was so low that many people considered the prospects for engaging in its manufacture were rather discouraging, and it was suggested that the numerous new factories which were about to go into operation might "over-do" the business. The experience of the past season has shown those fears not to be well grounded. With increased production we have had higher prices. This has been the case all over the country. Mr. Baker says:

"Michigan does not as yet produce, in my estimation, over one-eighth of the cheese that is consumed here. More factories would do well in our midst, and several are in the process of erection. We are looking forward to the time when our dairy products will equal if not excel those of the old dairy districts of New York, in quality, if not in quantity. All we want is experience, for we have the other requisites necessary to accomplish the object."

The cheese-factory of Fowler, Kinne & Co., at Reading, Hillsdale county, was erected in 1867, but was not ready for

business till the following spring. From a visit made in October last, we are enabled to say that it is one of the most complete establishments of the kind in the country. The main building is 32 by 100 feet, and three stories high. The tank-room is 14 by 14 feet, and two stories high. The engine-room is 14 by 20 feet, and one story. A box-factory is attached, which is 20 by 30 feet, and one and a half stories high. A bored well, twenty-seven feet deep, affords abundance of water, at a temperature in summer of 46 degrees.

The cost of the buidings and fixtares was \$8,800. They are handsomely finished and painted. A considerable extent of ground around the factory has been graded, and planted to shade trees. It is really an ornament to the village and neighborhood, and the order and neatness observed in its management indicate a laudable pride in those to whose charge it is committed.

The making of cheese was commenced here on the 4th of May, and finished on the 24th of October. The average number of cows for the season was 250, and their average quantity of milk was 3,776 lbs. The quantity of milk required for one pound of *green* cheese, through the season, was as follows: May, $8\frac{1}{2}$ lbs.; June, $8\frac{3}{4}$ lbs.; July, $9\frac{1}{2}$ lbs.; August 9 lbs.; September, $8\frac{1}{2}$ lbs.; October, 8 lbs. Average quantity of milk required through the season for one pound of *cured* cheese, 9.84 lbs. Profits on hogs fed chiefly with whey from the factory, \$749 06. Average profit per cow, over and above manufacturing and selling expenses, \$65.

The capacity of the factory is calculated at 1,000 cows, or for making into cheese the milk of that number. A large increase over the number whose milk was sent here in 1868, is expected in 1869.

ADDRESS ON DAIRYING.

At the late meeting of the Illinois and Wisconsin Dairymen's Association, at Elgin, Ills., X. A. Willard, Esq., of Little Falls, N. Y., delivered an address from which we take the following:

In discussing matters pertaining to the dairy, not the least important question is its profits and future prospects. The large increase in dairy farming from 1864 to 1867 made it extremely difficult to determine what was to be the result of this wide-spread dissemination of the factory system. We commenced in 1867 with no accurate statistics from which to estimate the probable production, and with insufficient knowledge as to the possible demand in the country. England had taken from us about 50,000,000 lbs. of cheese in one season, and it was thought that it could be increased to ten or fifteen million pounds more, if prices were low enough to undersell with our superior article the poorer English grades. Our probable production was over-estimated, and probable consumption under-estimated. Thus the prospect for high prices seemed dubious. We also had an army of agents and small dealers anxious to do business and obtain the percentage upon their purchases. Thinking that cheese-making in America had reached the limit of over-production, they, with the shippers, urged the necessity of pushing our good cheese forward to the utmost, regardless of the producer's interests, and, as they said, rescuing the entire production from dire disaster. This created the impression that the market was glutted; and every one who handled cheese, in the season of 1867, felt insecure, and the consequence was that prices below the cost of production ruled during that season.

The cheese product of 1867 was the largest ever made. In America it amounted to 215,000,000 pounds, and in Great Britain to 179,000,000 pounds; total, 394,000,000 pounds for the two nations. The English consumption that year was 309,000,000, and the United States consumed 160,000,000 pounds; thus we have the consumption of 469,000,000 pounds by the two nations, which is 75,000,000 pounds more than the production; in other words, to supply the demand of the two countries, they must import from some other part of the world 75,000,000 pounds. England supplies this deficiency from Holland, but France now comes in as a competitor for their

surplus: hence, America must henceforth be the main source from which England supplies her importations, especially as we produce a superior article to the Dutch.

Another point generally overlooked is, that England doubles her population every 40 years, and English cheese consumption more than keeps pace with the increase of population. This will make an annual increase in consumption of cheese of eight or ten million pounds, and in the States the increase of consumption from increase of population is about 8,000,000 pounds, thus giving an increase of 16,000,000 pounds, to be supplied by increased dairy business. Therefore, it is very doubtful if we shall ever reach the limit of over-production, because the consumption of butter goes on in more rapid proportion, and a considerable number of dairies must be devoted to that object.

From these statistics it appears that there is no branch of farming more remunerative or enduring than the dairy. The past year has been, on the whole, a very prosperous one for dairy farmers. The following is an estimate of the quantity of cheese in stock in the leading Eastern markets during the first weeks in December, of 1867 and 1868: in 1867 there were 863,000, and in 1868 only 310,000 lbs. This must indicate that America will be stripped bare of dairy products by spring, and that high figures may be anticipated for the early made.

In the matter of securing fine flavor in both butter and cheese, some points have been entirely overlooked in previous discussions. It is only recently that the true causes influencing the flavor of dairy products have attracted our attention. And among these, the question of clean, pure water for stock has not been sufficiently appreciated. Milk contains eighty-seven per cent. of water, and it would hardly seem reasonable to expect that the animal could overstep the laws of nature and manufacture good milk from stagnant water; yet such has been the case, and because manufacturers have not been able to make a good product out of such milk, they have been blamed. With all our knowledge and experience in New York,

we have not been able the past year to obviate having some bad-flavored cheese during the hot weather, especially the July cheese. I took some pains to study this question, and I found by examining farms in numerous instances that stagnant, putrid water was one of the leading causes. There were other causes, but this one was invariable. In one instance the cause was attributed to the milk of one of the patrons whose cows had been drinking from frog-ponds. This man changed his fences so as to get good water, and so the trouble ceased. In the private dairies of New York and England, particular attention is paid to this matter. On farms where springs are deficient, the defect is to be overcome by digging a well and applying wind-power for pumping, which can be inexpensively erected and is durable. It is the best plan to have the water pumped up into a tank, and so arranged that it can run back into the well after it has stood a short time, as this will prevent its becoming contaminated by foul gases.

Another point on which the old dairy farmers are in error, which is the cause of great impurities in milk, is the bad construction of milking stables, most of them little better than pest-houses, owing to bad ventilation. So bad are some of them, that I have seen delicate women faint away in them in hot weather. Follow the milk which comes from these places to the factory, after having been confined in the can under a close-fitting cover, and you will find it most offensive in odor and putrid. If there is any manufacturer present who can make clean-flavored goods from such milk, I should like to see him and hear his process. In this respect the English farmers are ahead of ours. Their milking stables are open on one side, cool, and well ventilated, and milking made a pleasure to animal and milk-maid. But I must say, the new dairy districts are in advance of the old in this respect. The West may get ahead of the East yet, as everything is new here, and there are no prejudices to counteract.

I have said that dairy farming promised to be remunerative and enduring. The statement needs modification. It *does not*

promise to be remunerative to those who make a poor or inferior product. It is also ruinous to the dealer. I have watched the history of failures among provision merchants, and it is the poor stuff in the end that breaks the camel's back. I come here to do you a service, and I beg of you not to fall into the errors of the old dairy districts. After you have provided a clean, well-ventilated milking stable, let each milker take a pail of water and towel into the stable, wash the cow's udder and wipe it dry with the towel, and then proceed to milk; you will then have no filth dropping into the pail, and water is so cooling and grateful to the animal, that she is quieted, gives down the milk at once, and will yield enough more during the season to pay the whole cost of milking. It is an inhuman practice to cut the cow's tail to get it out of the way of the milker; by means of a rubber band it may be fastened to and unloosed from the cow's leg.

Preparatory to milking, the teats ought always to be well washed with a sponge and cold water. This is not only a cleanly habit, but it keeps the teats in good order, and frequently prevents inflammation, and in certain cases restores the flow of milk by warm applications. A cow that has always been treated kindly will generally stand quietly, and appears to enjoy the operation. It should always be done by one person, and females are preferable, because they are more likely to be patient, kindly, as well as cleanly. It would be impossible to touch upon all the points of importance to dairymen in this address. The topics which I have chosen have not previously received attention, because only recently discovered.

For forty years, New York dairymen have been under the impression that the quality of butter and cheese depended entirely upon the manipulations of the milk, wholly overlooking its conditions ensuing from the manner of production. Of course, much depends upon the manufacture, but good goods cannot be made from bad material. In many points we have advanced to the highest English standard. Our best manufacturers are able, at certain seasons of the year, to make as fine

goods as are to be found in the world, but they are not uniform during the season. What is the matter? and where is the remedy? I was the first to direct attention to bad milk,—milk spoiled before reaching the factory, arising from many causes. You cannot hide the bad flavors in cheese, which may be traced to manures in the stable yard, from the English experts. They trace the cause at once. So, such cheese abroad is denounced, as it ought to be, as unfit for human use, and hustled off to the first bidder, and the factory from which it came ruined. The bitter taste in cheese comes from the ox-eye daisy and other weeds, and at certain seasons is very offensive. These causes are chargeable to the farmers and not to the manufacturers. Dairymen can never expect success if their goods are quoted at less than the cost of production. We can make it a great success. We can become the controllers of this great staple throughout the world; but in order to do it, we must show the world we can produce the best article.

The next subject touched upon was the proper cooling of milk, the necessity of which he urged upon the Convention in a very forcible manner, giving descriptions of several apparatus which had been invented for the purpose.

To insure the delivery of pure, sweet milk, he urged the Convention to adopt the following rules, to be posted on the door of every factory, and addressed to the patrons, saying: "This is the unanimous voice of the Dairymen's Convention of 1869:"

1. That no milk is good which is made from filthy, stinking waters of slough and frog-ponds.
2. That no milk is good that comes from cows dogged, or over-driven in hot weather from the pasture to the stable.
3. That no milk is good that comes from cows pounded or kicked, and cruelly treated by brutal men.
4. No milk is good that comes from diseased cows,—cows that have sores filled with pus, or that have udders broken and running with corruption.

5. No milk is good that comes reeking with manure and filth from the stable.

The speaker was interrupted after reading these rules, and a motion for their adoption was most enthusiastically carried.

The question of butter-making was then discussed.

The cheese-factories have been of much service to butter-making, by equalizing and raising the prices. We had already an over-production of poor butter. He thought really first-class butter was worth fifty cents a pound; while he did not care how little poor butter sold for. Cream contains about 64 per cent. of water and 25 per cent. of butter. One quart of good cream will produce on an average thirteen ounces of butter. Cleanliness, and a temperature of about 60 degrees, never less than 55 degrees, are the most important conditions in churning. The churn should be cleaned with great care. When butter forms, the churning should cease, the butter be taken from the churn, and all buttermilk worked out, using the ladle instead of the hands.

Good white-oak wood is best for butter-tubs. He approved the establishment of butter-factories, thereby getting better butter and greater profits. Cheese from skim-milk would be much used. China would consume much of it. We make about 500,000,000 pounds of butter each year, in this country. The best Orange county (New York) butter-makers get \$1.00 a pound all the year.

Referring to cheese-making, he gave the views of Governor Seymour, delivered by that gentleman in a speech to the American Dairymen's Convention, at their recent annual session in Utica, New York.

The market demands a cheese of solid texture, that is mellow under the finger, but yet of sufficient firmness to be safely handled, and will not fall to pieces while in the hands of the dealer; is of a clean, nutty flavor, melting in the mouth, and having that delicious aroma that forces itself upon the attention of the customer. A bad or poor-flavored cheese does

infinite mischief by clogging the appetite, and disgusting those who try to eat it,—just as a bad oyster taken by chance in the mouth will make one sick of oysters for a life-time. In the first place, for good cheese, the requisites are: ventilation, the milk to be properly agitated during the night; in setting the milk, high temperature must be avoided, which creates ferments. In cheese-making the work must not be hurried; what heat is required must be slow and gradual, giving the curds time to do their own work, the cheese-maker watching all the conditions, and standing ready at any time to check the curds when the proper changes are developed.

PRINCIPLES OF CHEESE-MAKING.

At the fourth annual meeting of the American Dairymen's Association, held at Utica, N. Y., much valuable information was brought out in reference to various points connected with cheese-making. From the Report of the Association we make some extracts, the perusal of which cannot fail to be beneficial to the dairymen of Michigan. The following is an address of L. B. Arnold, of Tompkins county, N. Y., on the subject of "cooling milk before cheese is made therefrom, and the cause of the early decay of American cheese:"

The history of the production of cheese in the United States is a history of progress and development. From small beginnings it has steadily increased till it has assumed a magnitude of immense proportions. The low price of land has so kept down the cost of cheese as to make it a cheap luxury, and from its cheapness there has arisen a large demand for home consumption. Formerly it was all consumed within our own borders. So lately as 1850, out of an annual production of 110 millions of pounds, 100 millions were consumed by our own people. But lately a demand has sprung up abroad for our goods, which, with the introduction of the factory system, has expanded its production beyond all precedent. We are now manufacturing the enormous quantity of over 200 millions of pounds annually. It is evident that such a vast amount could not find a market at home at remunerating prices. Over one-fourth of this amount is now consumed by other nations; and it is on this export demand that we are now dependent for living rates.

It behooves us to study the requirements of that demand, and to adapt our cheese to its necessities. But it is notorious that we are not fully satisfying the requisitions of our foreign market. The best English cheese outsells the best American cheese by about one pound sterling per hundred weight.

While some of our goods sent abroad would be accounted good in any market, much that appears excellent when it leaves the factory loses its excellence before it reaches its destination. We are not realizing for our products what we ought; and we are without mercy, in a crowded market, from the perishable nature of our goods.

The early decay of American cheese, which has become an acknowledged fact, is, I have no doubt, the result of a variety of causes. Among these causes may be named: bad and excessive rennet, light salting, light scalding, new or uncooled milk, diseased milk, putting the curd in press while too warm, curing too rapidly, &c. Each of these, doubtless, has its bearing upon the general result, but to no one of them do I believe the early decay of American cheese wholly belongs. Recently the opinion has been gaining ground that the use of new milk, or milk that has not been cooled, is the main cause of a too early maturity. All milk must be warm when curded; but new or uncooled milk is supposed to differ from that which has been cooled, in two important particulars, viz: in containing a peculiar heat called *animal heat*, and a peculiar odor called *animal odor*; the two in some way so blended together, that the removal or retention of one carries with it the removal or retention of the other.

In answering the invitation to assist in opening the discussion on the topic before the convention, I propose to confine myself to the consideration of these particulars, and leave to those more familiar with them, the other causes of decay.

And first, *Animal Heat*. What is it? Is it any different from any other heat? In the opinion of many intelligent dairymen, and of some agricultural writers and editors even, there is something peculiar in the warmth of newly drawn milk, that is

very efficient and controlling in the production of bad results; and that, as before stated, it is intimately and necessarily associated with the odor that accompanies such milk; and this opinion is strengthened and confirmed by observing that, when the natural warmth is removed, the aforesaid odor disappears with it. The inference is then very natural that animal heat is the prime instigator of all the injuries that are supposed to follow the use of new milk; and that its removal implies also the removal of the odor, and is all that is necessary to prepare milk for the hands of the cheese-maker.

In opposition to all this, we were last year assured by Professor Brewer, that animal heat does not differ from any other heat; that all heat is essentially the same; and all chemists whose authority is worth consulting, tell us the same thing. In the face of these conflicting opinions, I have preferred not to follow either implicitly, but to determine for myself, first, whether the heat and odor are inseparably connected; and secondly, if they exist independently of each other, what is the capacity of each for evil. By abstracting the heat rapidly by an application of ice and cold water, I easily succeeded in removing the heat and leaving the odor in the milk. It is true that, in experiments for this purpose, the odor was not so apparent to the olfactory nerves as to the organs of taste. The animal *odor* became an animal *flavor*. But, upon warming the milk again, the odor revived. Then, by the use of a filter of pulverized charcoal, I succeeded perfectly in removing every trace of animal odor from milk when first drawn, and leaving the animal heat in the milk. These experiments fully satisfied me that there is no necessary connection between the two, and furnished satisfactory evidence that the former does not differ from heat derived from other sources. Instead of using the phrase "animal heat," we may as well drop the term "animal," and inquire what effect heat has upon newly drawn milk. But the effects of heat upon milk are so well known, that I need not waste many words, nor the precious time of this conven-

tion, in answering this query. Everybody knows that heat hastens the development of acidity and the decomposition of milk, and the higher the temperature the greater the effect. This is true until we approach 170 degrees. But above that temperature those effects are, for awhile, retarded. I will not stop to explain why the results are different above and below the degree named. It might interest the curious, but it is not necessary to the discussion of the subject under consideration, so I will let it pass, as we have been admonished to be brief.

Now, what of the odor that accompanies new milk? What is it? Whence is it derived? Is it something that necessarily constitutes a part of the milk? Or is it something that like milk is formed out of the elements of the blood? No: it is not either. It is, I apprehend, derived from the waste material of the cow's body.

Animal bodies are constantly undergoing change. A steady supply and waste are necessary to existence. Food is digested and carried to every part of the system, and so vitalized as to become a part of the living structure, and when it has served the purposes of life, it is cast out as waste and dead matter. Physiologists have demonstrated that a large portion of this waste is cast out in the form of gases. No part of the structure is impervious to the passage of these gases, so necessary everywhere to be got rid of. All parts of the body are made open to their escape. All the liquid secretions of the body absorb them; they are cast out in the breath; and very abundantly through the pores of the skin. It is this gaseous waste, absorbed by the milk in the udder, and which escapes when drawn, that we recognize as the animal odor in milk. This is the material which we are carrying, shut up with the milk in cans, to our factories, to be worked into cheese with which to supply our customers at home and abroad. This is the agent to which, I believe, may be ascribed nearly, if not *all*, the evil consequences that arise from using new milk.

Let us now study the nature of this odor and trace its results. Being derived from the changing elements of the cow's body,

it must be similar in composition to the gases arising from other decomposing matter, and like it, infectious. It is *in fact* infectious. Confined in warm milk, it soon induces taint. There can hardly be a cheese-maker in any of our factories, who has not seen instances of this kind, to his regret. They are of frequent occurrence, and are the direct effect of the gases in the milk, and not of the natural warmth, as many suppose; for, if the gases are removed, and the milk is kept warm, and in other respects treated the same, it will not *taint* but will become *sour*. Milk with the odor out, has, in my experience, invariably *soured* instead of *tainting*.

The quantity of gas in milk is probably not very large, but it is efficient in action. At previous meetings of this Association, it has been repeatedly said, (and all observing cheese-makers know it,) that milk curdled before it has had time to cool, makes the cheese strong and unpleasant in flavor, porous in texture, and much inclined to huff. I have never had the privilege of inspecting cheese in foreign markets, and not very extensively in our own, but I am told by those who have, that this style of cheese is very liable to premature decay. This is true to the extent of my observations, and it is equally true that, other circumstances being equal, where the most efficient means have been employed to remove the disturbing element, the cheese has been the least liable to huff, and of the cleanest flavor, and least affected by time.

But there are those present who have had better opportunities for observations of this kind, and I appeal to them to enlighten us on this point. But I have hardly a doubt that they will corroborate my own observations, nor have I any doubt that the mind of the dairying public is setting in the right direction, when it ascribes to some agency in new milk, a leading cause of the early decay in American cheese.

Having shown whence that agency in milk is derived, what it is, and pointed out its tendency to induce change and decomposition in both milk and cheese, I shall probably be expected in the next place to suggest some efficient means of getting it

out of the milk, or of neutralizing its effects. But I prefer not to respond to that expectation now. I propose to study a little further the peculiarities of this disturbing agent. I have said it was gas in the milk. Being in that form, it is, like other gases, subject to certain laws, one of which is expansion and contraction from a variation in the temperature. Though all gases do not expand and contract just alike, yet they all expand with heat and contract with cold. The gas in new milk follows this law. By an increase in temperature, its elasticity is rapidly increased, and by a decrease in temperature, its elasticity as rapidly diminishes. The fact is very suggestive of the treatment milk should receive. At 90 degrees its elasticity pushes it slowly through a body of milk, and when it reaches the surface, by the law of the general diffusion of gases, it is taken up by the atmosphere and conducted away. It is hardly necessary to remark that its exit would be facilitated by stirring. If the temperature be raised to 10 or 20 degrees above blood heat, its elasticity will be so very much increased that but little stirring will be required to cause its escape. But drop the temperature below blood heat, and it diminishes in elasticity as the temperature falls, till it has not power to escape; or, what is more probable, is condensed into a liquid; for it will remain in the milk for a long time, if kept sufficiently cool. Because the "cowey" smell has died away when the milk is down to 70 degrees or below, it has usually been supposed that the odor, or *cause* of the odor was wholly removed. But it is by no means necessarily so; for unless the cooling has been very slow, or the milk has been spread so thin as to make the exit of the gases easy, the cause of the odor, the condensed gases, will be there, and be readily detected by the taste; and at 50 or 60 degrees it will remain there till the milk sours. The "cowey" flavor is most effectually preserved when milk is cooled in a close vessel, shut out from the air, and the heat absorbed away by an application of ice or cold water. For reasons before stated, it is unphilosophical to cool milk in this

way, and yet it has its merits. It is better to have the gases all in, than to have the milk either tainted or sour.

The gas in milk varies both in quantity and relative effect. For instance, it is in the smallest amount when the cow is in good health, and quiet. It is more abundant when actively exercised, as when sharply driven to the yard by dogs. It needs but a little hurrying, especially in the morning, to make the effect apparent in cheese. It is different in health and disease, and very abundant and very infectious in cases of fever. There is more in a state of debility than in strength; and more when pinched with cold than when comfortably warm. The most marked effects that I have observed have been produced by the odor of milk from cows in a feverish state, a state that may generally be detected readily by smelling the milk. It becomes so infectious that a small quantity—the milk of a single cow, even—will infect a whole vat full of good milk. In connection with the rennet, it becomes a ferment, inducing rapid changes in the milk and curd. New gases are evolved, which, becoming more elastic as the temperature is raised, swell out the lumps of curd, giving them a soft, spongy feel, till at length their bulk is so much increased that they float on the whey. A vigorous action is now going on in the curd; the work of decomposition is fairly begun; the solid structure of the casein is broken down, making the cheese appear salty and rich. At first it huffs badly from incipient decay; but after a little the development of acidity will check the huffing, and the cheese will behave better. This state of things may, to a considerable extent, be counteracted by means which, I have no doubt, will be fully described in the discussion on floating curds; but I do not believe that cheese from such milk can be long saved from decay.

But perhaps some one will say, "This is the result of diseased milk; it is not chargeable to animal odor; the milk itself is faulty." I once thought so, too, but I have found since that I was mistaken. In the worst cases I have seen, the milk, for aught I can discover, is of itself as good as any other. It may

be somewhat altered in the proportion of its elements,—perhaps it is,—but it does not differ materially from other milk when new. I filtered a sample of feverish milk last summer, in the fore part of August, when the weather was so very hot and dry, and floating curds were so very popular. The result was very striking. The filter was all ready, and the milk turned in as soon as drawn, and though it stood at about 90 degrees when it issued from the filter, it was free from any offensive odor, and its flavor was delicious. It was in perfect contrast with its former condition, and also with the same kind of milk cooled by ice-water, to a much lower temperature. This charged the fault back upon animal odor. It was nothing else than animal odor, in its worst forms and in increased quantity, derived from the excessive waste of the living structure, occasioned by the depressing influence of the long continued hot weather, and the use of scanty and stagnant water.

There are other peculiarities about this odor in new milk which it might be interesting to notice, but I have pursued the investigation as far as is necessary to the subject before the convention, and I will close with a few words in answer to the query that seemed to suggest itself in the earlier part of my remarks, viz : How shall we get rid of this odor, or neutralize its effects? I need not add many words for that purpose. The remedy is suggested by what I have already said. The first thing to be done is to give the gases from which the odors arise, a chance to escape as soon as possible after the milk is drawn, for the reason, firstly, that they are then most elastic and escape most easily; and in the second place, to keep them from imparting an influence to the milk by their presence; and then the milk cooled to prevent souring. The reason for doing this at the dairy is, that it is generally a little too late when the milk gets to the factory. There are a variety of ways for deodorizing and cooling milk, as the devices on exhibition for that purpose indicate. But, whatever means are employed, a thorough exposure to the air should be involved in the pro-

cess. It is the air which takes up and carries away the odor. It can be imparted to nothing else.

It is this gas in the milk, rather than the acidity, that we have to contend with in striving to lengthen out, so to speak, the lifetime of our cheese. Acidity may affect flavor, but it does not hasten decay. It is the infectious gas or odor that does the destructive work in new milk, and it must be got out to be avoided. It is not sufficient, especially in hot weather, to *conceal* it, as may be effectually done by cooling without a thorough atmospheric exposure; for, if it is retained in the milk by condensing, it will be there to work its legitimate effect upon the first favorable circumstance for its development. There will be nothing gained to the keeping qualities of our cheese unless this point be regarded. You may get milk to the factory in apparently the finest condition, with the gas in, by keeping it cold, but, when you come to scald your curd, you will find that the heat will cause the condensed gas to resume its elasticity, and its escaping be evidenced by the "cowey" odor of your scalding curd; and the leaven which has thus been carried into the cheese will hasten its early decay, if it ever falls into circumstances that favor its development. This will be especially true when there is anything of a feverish or diseased condition about the milk, and will be the least seen when the cows are comfortable and quiet.

The next thing I would suggest is, that the cows be kept in perfect health, and furnished with a supply of wholesome food and pure water, and be kept quiet. This will reduce the odor to its minimum, both in quantity and effect. Warm milk, when thus produced, though not in its best condition for making cheese for long keeping, or of the finest flavor, will produce a good cheese, and one that would not be very seriously objected to. But there is very little milk thus produced. The artificial circumstances under which domestic animals are cared for, are seldom such that they do not in some way deviate from the requirements of perfect health. Dairymen ought to feel themselves constrained to keep their cows in per-

fect health, from high moral considerations, as well as from motives of interest; they may be scattering the seeds of disease by a vitiated product, as well as injuring the financial value of their goods.

Dr. Wescott, of Onondaga county, N. Y., stated that he had made many experiments with milk, chiefly with the view of producing the best quality of butter from it; but as the same general rules would probably hold good in reference to cheese, he proceeded to offer some of the results of his observations. He said:

"It seems to be a foregone conclusion on the part of dairy-men, perhaps universally, that milk, during hot weather at least, should be cooled as soon as possible after being drawn from the cow, from its natural temperature, about 98 degrees, to that of 60 degrees, or not more than 65 degrees, and I will simply state that this conclusion fully accords with that which my own experiments dictated in reference to butter-making. So much for the fact or necessity of thus treating milk before hoping to secure the best results in either butter or cheese-making. But what changes in the milk are thus produced, or why it is thus better fitted to produce a perfect article of cheese, there seems to be some difference of opinion even among those best informed upon the general subject."

On the best means of cooling milk on the farm before it is transported to the factory, Dr. W. said:

Every arrangement for this purpose should have, as cardinal points, cheapness and simplicity, combined with efficiency, going upon the supposition, moreover, that, generally speaking, water will, in the great majority of cases, be employed as the cooling agent, in order to secure the greatest cooling effect of water in the least time and with the least amount. To secure to the fullest extent such a result, *the cooling medium must be applied to the upper surface* of the milk to be cooled. It is a well-established principle or law of heat, that fluids cannot be heated from the top. Any amount of heat, applied to the top surface of a vessel of water, would not affect its temperature

to any perceptible depth. It is equally true that fluids cannot be cooled by applying the cooling medium wholly to the bottom surface. The cooling medium may be applied, as above indicated, in a very simple and easy way, by passing a stream of cold water through a buoy which rests upon the surface of the milk in the can in which it is to be transported, and which will rise as the milk is from time to time poured into this can. This stream of water need not be constant, but the water from time to time poured in, will serve to effect the object in a sufficiently short space of time.

Any one who has not tried this experiment will be astonished to see how small an amount of water, comparatively, and how short a time, will be required to bring the temperature to the required standard,—say from 98 to 60 degrees of heat. In an experiment which I carefully performed to test this question, I found that a can of milk which was changed from 95 to 60 degrees in 35 minutes, required more than three hours to effect the same change when left to stand in the same room which was kept at the same temperature, about 60 degrees. The amount of water employed could not have exceeded the amount of milk thus cooled. This float should not cover the entire surface of the milk, as free access should be given to the air during the process. I give this as a reason for leaving such space, instead of saying that such space is left for the escape of noxious vapor, which I do not believe to exist in the milk, unless putrefactive fermentation has commenced. If an explanation of this contact of air is demanded, I may be obliged, with only my present knowledge and observation upon this subject, to deal rather in generalities than to give a specific explanation. One thing is well settled, which bears strongly upon this solution. It is well known that, if milk have the air fully exhausted from it, and it is thus kept, treated as in fruit in the process of canning, it will remain unchanged for almost any length of time, in its normal condition. The only reason why milk does not sour in the bag of the cow after it is fully finished and

evolved by the secreting vessels is, that it does not contain air within its structure, and is kept wholly protected from the external atmosphere. I shall attempt no more specific explanation on this occasion, to show the good offices of the air during the process described for cooling milk. After the milk is cooled, it is still to be transported to the cheese factory,—it may be a half-dozen miles. To retain the temperature which we have thus gained, some provision is required. This may be easily accomplished by surrounding the can with a thick covering of cloth, and thoroughly wetting it. This serves a double purpose: it is a non-conductor of heat from without, and by the constant evaporation from the surface, cold is produced. This covering, hence, of itself, becomes an important cooling medium.

The milk cooler exhibited to this association by L. T. Hawley, of Onondaga, and to which he has recently added and patented important improvements, seems to me to meet fully all of these indications.

Joseph B. Lyman, of New York city, gave an account of various experiments he had aided in conducting, from which the following conclusions were deduced:

1. Two months in the year, on an average, this climate is too hot and sultry for dairy business, unless special pains in cooling the milk are taken.

2. Reducing the milk to between 50 and 60 degrees, as soon as the milk comes from the cows, purges it of the objectionable odor and flavor, and that odor and flavor does not return, although the milk may stand for many hours in a temperature above 80 degrees.

3. The contact with air, obtained by letting a stream of cooled milk fall a few inches from a spigot into a can, is enough.

4. After the milk is thus cooled, the cream rises well, and will, when churned, make excellent butter in dog days.

5. There are many ways in getting the milk in contact with a cold surface. The best milk-cooler need not be costly. Any

farmer with good mechanical gumption, can fix some contrivance by which he can reduce his milk down to 60 degrees, or thereabout, in the hottest weather.

The conclusion to which I am led, is that in our climate, especially as we supply an English market and must suit it in order to get good prices, the dairy farmer should have one of three things in order to make good cheese all summer. 1st, a spring of cold water with some contrivance for cooling milk by contact with a cool surface made so by the water; or 2d, a well-stored ice-house; or 3d, a deep cellar so cool and yet so dry and sweet-smelling that he can keep his milk there at a temperature of about 60 degrees. Moreover, our climate requires cooler cheese rooms than we have. The walls should be of stone and they should be shaded so that the make of July and August may not ripen so fast, and take on that "twang" which many consumers in this country do not object to, but which spoils it for the English mouth.

THE CHEESE MARKET OF 1868.

At the meeting of the Association before mentioned, John M. Webb, of New York, gave an address reviewing the cheese market of 1868, and making various suggestions in regard to the manufacture and curing of cheese in reference to its sale in England at remunerative prices. He had lately returned from that country. After some remarks in reference to the relative positions of the shipper and the manufacturer, Mr. W. said :

The season just closing has been unprecedented in character, and in marked contrast to the ones immediately preceding it. Last year, at this time, we had to report to you a dull and declining market, with full stocks of cheese on both sides of the Atlantic; this year, stocks are everywhere light, and the market wears a firm and healthy aspect. Last year one of your most prominent speakers expressed his fears that you were on the high road to over-production, and consequently ruinously low prices; to-day, in looking back on the closing

season, you must confess that prices have at least been *fairly* sustained, and you know better than I can tell you whether your cheese-houses are encumbered to any extent with surplus or unsaleable stock. A brief review of the current season will enable us to account for this changed position of affairs. Last season wound up badly, with heavy stocks left over, both of American and English cheese. Holders of the latter, with a keen recollection of their disastrous experience of the previous year, were determined to clear out before the hot weather should set in. Dealers in American had no option but to drop their prices in correspondence to the decline in English cheese, and hence it was that some rather heavy purchases made in New York during the months of February and March resulted in a smart loss to the over-sanguine shippers. The trade in England, occupied in the disposal of these heavy stocks of old cheese, were much less eager than usual for early shipments of the make from this side of the Atlantic. In a certain sense this was well, for your fodder cheese last Spring was not only short in quantity, but for the most part very poor in quality. It was not till we were fairly working on the grass cheese that we had any active English demand. From that time out we had a flowing trade, which continued until the English dealer and English consumer alike began to get a surfeit of that strong-flavored, loosely-made, bad-keeping quality, which was the universal characteristic of your July make of cheese. This inferior quality was doubtless largely owing to the intensely hot weather then prevailing; but whatever the cause, your very serious attention should be directed to the discovery of a remedy, for not one single dairy, as far as my personal experience and pretty full inquiries extended—not one single dairy stood the test of that most trying month. Even those dairies of which I spoke last year—dairies that for a series of years have been always and uniformly excellent—did not hold their own last July, but proved, in the matter of flavor and keeping-qualities, to be no better than the great majority of your State factories. Thus, about the beginning of September, the mark-

ets of London and Liverpool, were full of badly-made, strong-flavored cheese, of which both dealers and consumers were heartily sick, and there was a general outcry for some rich, closely-made, clean-flavored cheese at any price. Let us now see in what position was the English farmer for supplying this demand.

Up to the middle of June the season in England was most favorable for dairying, and the make of cheese there was, perhaps, the largest ever known. Then came a drought, unprecedented for severity of duration. Under its blighting influence the make of cheese had fallen to one-half of an average by the middle of July. When, toward the latter part of August, the longed-for rain did at last come to the rescue, the pastures did recover with unexpected rapidity, and from the middle of September to November 1st, there was a fair, but not an average make of cheese of good quality, which will probably be brought to market about February or March next. Some very sharp frosts closed up cheese-making by November 11th. To recapitulate. Up to the middle of June we had a very large make in England; by the middle of July it had shrunk to one-half an average; by the middle of September it had recovered, and to the 1st of November was fair in quantity and good in quality. The decrease in the make was, however, by no means the only consequence of the unexampled heat and dryness. Not only was the quantity short, but the quality was worse than had been seen for many years, and added to this was the unfortunate circumstance, that very much of the early make, which I have described as being both abundant and good, was spoiled on the farmer's shelves by the excessive heat. Hence a clean-flavored dairy of English cheese was very hard to find—in fact, really choice quality was never so scarce—and of course for his diminished make, inferior though it might be, the farmer naturally expected an increased price. You will thus see that the English makers were in no position to satisfy that demand for fine mild-flavored cheese which was so eager and so general. We had no resource but to see what the

American dairymen could do for us, and I am happy to say that we did not turn to them in vain. Your August and September make of cheese proved to be of unusually fine quality. I am only repeating the opinion of those best qualified by experience and observation to judge on this point, when I tell you that never, since the factory system was inaugurated, has there been so large a selection of fine and almost faultless American cheese as was presented in your August and September make. Not only did most of the standard favorites regain their character and resume the position they had lost in July, but the general quality of the make in all parts of the State was vastly improved; dairies of hitherto only second-class reputation turned out cheese that in point of style, solidity, and flavor was second to none. When this fine quality which I have been describing first reached the English market, its superiority was at once recognized, and considerably enhanced prices were conceded for it, but the keenness of the first demand once satisfied, the dealers strenuously resisted any further immediate advance. The result has been a quiet, but firm and gradually rising market ever since. While acknowledging the quality of the American to be equal to the best, and better than the bulk of the English cheese this season, it is with great reluctance that our English buyers pay anything like a full value for the former. It is, however, a great point gained that they admit the superiority of the American make, and that its recognition is being surely, even if slowly, forced upon the consumers of Great Britain. With little or no cheese left back in the country, and with a greatly reduced and rapidly diminishing stock in New York city, the season of 1868-9 promises to wind up with a complete exhaustion of stocks both here and in England. Hence the prospect for the new season is highly encouraging, and your energies should be bent not only in the direction of increased production, but to keeping up that production to the very highest standard of quality. In this way only can you maintain the healthy position you have gained for your factories. A great orator has said that 'the price of liberty is

eternal vigilance.' In these days of competition and advancement, no less a price must be paid by those who would excel, or even keep their place in ranks of business, whether mercantile or manufacturing.

I have but little to tell you of other cheese-making countries. The quality of the Canadian cheese in the early part of the season was very disappointing. There was a great deal too much harsh, dry, and over-scalded cheese, and where a dairy showed quality it was too frequently accompanied by a most objectionable flavor. But in August and September our Canadian neighbors, like yourselves, made some really fine cheese. The proportion of this sort was not so large, perhaps, as in your State, but the improvement was very marked, and the cheese, being nicely colored, is rapidly growing in favor with the English consumers.

Perhaps no country in Europe suffered more from the effects of last summer's drought than did Holland; but, at the same time, no country recovered so quickly from those effects. Of course the make of Dutch cheese is short, but less so than could have been expected. The increasing demand from France has done nearly as much as the short make to stimulate prices in Holland to an extreme pitch; added to which, the quality, like that of the production of other cheese-making countries this season, was very much below an average. Scotland suffered far less from the drought than did either England or Holland. There was a fair, though by no means a full make of cheese in that country. The consumption has been mainly on their own make, almost to the entire exclusion of the American article from the Scottish market. The shipments from New York to Glasgow, and the purchases in Liverpool for that city, have been unusually small. From Sweden, no progress is reported in their cheese-making experiment. Their product, while showing much quality, and a beautiful style of curd, is characterized by a rank, strong flavor. But so important is this new branch of industry in the opinion of the Swedish Government, that they have sent a deputation to visit the best cheese-

making districts in England, and study the methods there in use, with the view of remedying, if possible, this great defect in flavor.

The competition for the favor of the English cheese consumer virtually lies between the products of the English farmer and that of your factories. In this connection, I have a word or two to say on the subject of color. It is often asked, cannot we do away with the system of coloring, which adds nothing to the flavor or keeping qualities of the cheese—is even, in some instances, a positive draw-back to both, and above all, is a source of considerable trouble and expense to the manufacturer? It has even been said that if none of you colored your dairies, the English public must perforce consume your white cheese! This would be a very cogent argument if you had exclusive command of the English market; but in your present active competition with the English farmer, the carrying out of any such policy would place you at an almost fatal disadvantage. During my recent visit to the old country I made particular inquiry into this question of color, and found that the area of consumption of dead white cheese was a comparatively limited one. I found less general disposition to insist on a very high color, but *some* color is indispensable for all, except one or two districts. The experience of my London friends is, that their customers make less objections to a light shade of color than formerly, but they express their deliberate opinion that any attempt to force uncolored American on that market would at once drive the consumption on to the colored English cheese, and reinstate it in the position from which you are so rapidly displacing it. Is the end to be gained worth this hazard? That the supply of *uncolored* cheese may very easily be overdone, has been conclusively proved, quite recently, on the Liverpool market, where, within the last three months, I have seen white dairies, of otherwise faultless character, entirely neglected, while colored were in eager demand at a premium of $\frac{3}{4}$ c. to 1 c. per lb. The color that finds acceptance with the *largest* number of English buyers seems to be a bright straw color.

In telling you all this, I have no personal end to gain that in any way runs counter to your interests. The more saleable your cheese in the English market, the better for us all. It is no light matter to educate the taste of English consumers in the matter of any article of food. This difficulty we have experienced to the full during our endeavors to secure for American cheese that recognition to which its intrinsic excellence so fully entitles it. Those endeavors were materially aided by the alacrity with which you adapted your manufacture to English usage, in the matter of shape, size, and, not least, of color. By thus conforming to English prepossessions, (prejudices, if you choose to call them so,) you have insured a larger demand and much better prices for your cheese; and strong as is your hold on that market, believe me, you are not yet sufficiently masters of the position to dictate or run counter to the requirements of your largest and best customers. It may be well here to call your attention to the extraordinary rapidity with which the color has faded out of this season's cheese. The annatto is not altogether at fault, as the same deterioration of color has been observed in dairies using various kinds of annatto. The cheese colored by the liquid imported from England, has perhaps stood better than any other, but still has not retained its color as in ordinary seasons. Not being a practical cheese-maker, I cannot say which of the different reasons that have been suggested to account for this, is the true one, but it is a point well worth your very serious consideration.

Another matter to which I must advert, is that in some factories there has been placed in the center of the cheese a quantity of stale curd, apparently left over from the previous day's make. The most vigilant inspection frequently fails to detect it previous to shipment, but of course it is revealed whenever the cheeses are cut up on the counter of the retailer. This practice cannot be too strongly condemned; not only is it slovenly, not only is it a fraud on the buyer of the cheese, but

it is fatal to the character of the dairy. Sooner or later it must come to light, and then you may be sure, a very black mark is made against such a factory by those who have anything to do with the buying, shipping, or selling of it. A little care and judgment in filling your hoops, would put a stop to all such complaints in the future. If necessary, it would be better to make a few very small, rather than spoil several full-sized cheeses. Complaints have also been made of some dairies, otherwise fair, presenting a mottled appearance, as if the curd from different vats had been carelessly mixed together.

Shortly after the factory system was fairly started in this State, I ventured to predict that its manifest advantages would enable you in course of time to produce an article fully equal to the very finest English cheese; but some of my English friends were scarcely inclined to be as sanguine as I was in this matter. While from the first there have been a *few* factory dairies and occasional drafts of others, that have come very nearly, if not quite, up to the highest English standard, it was not till the August and September make of the present season was reached, that we were able to show the English dealers any *considerable* quantity of American cheese, that in point of quality, make and flavor, could not be beaten by any country in the world. During my visit to London last October, I went through a carefully selected stock of over 10,000 boxes of New York State cheese, with one of the largest and most experienced cheese-factors in the South of England. The inspection was close and critical. When it was concluded, I asked two questions. The first was: "How do these cheeses compare with the English make of the *current* season?" Said this most competent authority: "The season has been so unfavorable that I don't think I could get returns of equal quality in all the South of England." I then asked: "How does the stock we have been looking through compare with the best English cheese of an *average* season?" The reply was: "They are just as good, and I did not think it possible to get together

so many fine American cheeses." This is high praise, and the character and position of the speaker adds very much to the value of his testimony. I regret to have in any way to qualify it, but I am here to tell the whole truth. Indeed, the only claim I have on your attention is that, without fear or favor, I endeavor to represent things to you as they really are. Much of this cheese that we examined in the month of October, has been disposed of and given great satisfaction to the consumers. Several of the dairies, those apparently most likely to keep well, have been held over, and I regret to say that the latest advices from London report many of them to have faded in color, and become strong or rank in flavor. The result of the closing season then, as regards quality, would seem to be, that during two or three months you have made a larger quantity of finer quality than you ever made before, but also *that the cheese lacks keeping qualities*. Still, you have made a great step in advance, which should stimulate you to zealous and intelligent efforts in the same direction. I can honestly compliment and heartily congratulate you on the position you have gained, but much yet remains to be accomplished. Your endeavor must be to make superfine cheese, not only in one or two months, but from the beginning to the end of the season, and so to make it that it will retain its good qualities for a reasonable length of time. This is no easy task, especially in a climate of such extreme and sudden changes; but from what you have accomplished in the past, I am very sanguine of the improvement you will make in the future. The problem thus presented for your solution is undoubtedly one of *great difficulty*, but it has been well said, that "difficulty is only the measure of resistance to be overcome by superior force." In this age, and in this country, superior force is only another name for superior intelligence.

Mr. Webb's address was heartily applauded, and at its conclusion, Mr. Weeks, of Onondaga, moved that the thanks of the Association be presented to Mr. Webb for the valuable paper which he had read to the Convention.

RED CLOVER AND WHEAT.

The value of red clover as a preparatory crop for wheat, is well known to the agriculturist. The *reason* for this has, however, never been clearly ascertained. It is very true that other green crops have been successfully introduced into our rotations; but then these have been commonly fed off by sheep. Other crops, such as rape, buckwheat or mustard, plants which derive the chief portion of their purely organic matters from the atmosphere, have long been grown, to be either fed off, or ploughed into the soil. But here we appear to understand the chemistry of the operation, since a large amount of carbon is absorbed by the crop from the atmosphere and added to the soil. But, in these cases, the cultivator is careful to feed off or plough in his crop before it has ripened its seed. He uses the crop just when it is coming into flower. But these facts do not apply in explanation of the beneficial effects produced on the soil by the growth of red clover. In commencing a recently published very valuable report on this subject, Professor Voelcker observes (*Jour. Roy. Ag. Soc.*, Vol. iv., p. 397, N. S.): "The heaviest crops of clover removed from the soil, appear to render it more capable of yielding a good crop of wheat. The addition of even powerful saline manures to such clover-leys, seems hardly to improve the subsequent wheat crop."

To refer to only one series of experiments, with these saline dressings, carefully conducted, at Rothamsted: In this case the produce of wheat, grown after red clover, which had been cut three times, was nearly as great without any manure as

when portions of the same clover-ley were dressed with various fertilizers. Thus, the produce of wheat per acre was:

	Bush.	Pecks.
From the unmanured land.....	29	2
“ superphosphate of lime (150 lbs. bone-ash, 112 lbs. sulphuric acid)....	32	2½
“ 300 lbs. sulphate of potash.....	30	1½
“ 300 lbs. sulphate of potash and superphosphate of lime.....	33	3½
“ mixed alkalies—300 lbs. sulphate of potash, 100 lbs. sulphate of soda, 100 lbs. sulphate of magnesia.....	31	1
“ mixed alkalies and superphosphate of lime.....	33	1

Various, indeed, have been the attempts to explain the phenomena observed in the cultivation of red clover. Robert Baker, of Writtle, in his prize report upon the agriculture of Essex, remarked:

“Clover is grown only once in six or eight years, for if sown oftener it is apt to fail in plant; and even when in plant it is not very productive, unless highly manured, which is done upon the young plants in autumn. In that case it is mostly afterwards mown, but the usual practice is to feed with sheep through the summer, or to feed close until 1st June, when the stock is removed, and the clover is reserved for seed, producing from four to eight bushels per acre. Wheat generally succeeds it, but not so well as when the clover is grown for hay, the late period of sowing giving opportunity to the slug, which frequently destroys the plant of wheat.”

Then, again, Mr. C. Sewell Read, in his prize report on the farming of Oxfordshire, observes:

“One-eighth of the land is sown with broad or red clover. Its return only once in eight years does not, on light soils, guarantee a crop; and to insure a plant, some excellent farmers drill the seed instead of sowing it. The clover is deposited with a Suffolk drill having the turnip-seed barrel, the coulters being six inches. It is best done across the barley when it is up, and is afterwards rolled in. On most soils the clover is sown alone, without any mixture of rye-grass, and from 12 to 20 lbs. of seed are used per acre. Better crops of wheat are frequently grown after the clover has been *twice mown*. The

clover roots increase in size much more than when fed, and so afford greater nourishment to the wheat."

Voelcker further observes, (Jour. Roy. Ag. Soc., vol. iv. N. S. p. 397,): "Whilst it holds good as a general rule that no soil can be cropped for any length of time without gradually becoming more and more infertile, if no manure be applied to it, or if the fertilizing elements removed by the crops grown thereon be not by some means or other restored, it is nevertheless a fact that after a heavy crop of clover carried off as hay, the land, far from being less fertile than before, is peculiarly well adapted, even without the addition of manure, to bear a good crop of wheat in the following year, provided the season be favorable to its growth. This fact, indeed, is so well known that many farmers justly regard the growth of clover as one of the best preparatory operations which the land can undergo in order to its producing an abundant crop of wheat in the following year. It has further been noticed that clover mown twice, leaves the land in a better condition as regards its wheat-producing capabilities, than when mown once only for hay, and the second crop fed off on the land by sheep; for, notwithstanding that in the latter instance the fertilizing elements in the clover-crop are in part restored in the sheep excrements, yet, contrary to expectation, this partial restoration of the elements of fertility to the land, has not the effect of producing more or better wheat in the following year than is reaped on land from off which the whole clover crop has been carried, and to which no manure whatever has been applied. Again, in the opinion of several good practical agriculturists with whom I have conversed on the subject, land whereon clover has been grown for seed in the preceding year, yields a better crop of wheat than it does when the clover is mown twice for hay, or even only once, and afterwards fed off by sheep.

"Most crops left for seed, I need hardly observe, exhaust the land far more than they do when they are cut down at an earlier stage of their growth; hence, the binding clauses in

most farm leases, which compel the tenant not to grow corn crops more frequently, nor to a greater extent than stipulated. However, in the case of clover grown for seed, we have, according to the testimony of trustworthy witnesses, an exception to a law generally applicable to most other crops."

The elaborate investigations of the Professor are well worthy of the careful study of the agriculturist, since they materially tend to the elucidation of a very serious difficulty. The result of these long-continued labors rather inclines to the conclusion that it is the large amount of nitrogen, accumulated in the soil by the clover plant, that renders it afterwards so well adapted for the growth of wheat, and that the explanation of the phenomenon must not be sought in the amount of mineral matters required by either the clover or the wheat.

This conclusion might, perhaps, have been anticipated, by the fact well known to the agriculturist, that nitrogenous manures are commonly far more beneficial to wheat than those of a mineral or saline nature; and hence, also, we are led to strongly incline to the opinion that the clover plant possesses a power of assimilating nitrogen from another source than from the soil.

I can only give in this paper a brief quotation or two, explanatory of the results obtained by the Professor, referring to the last published number of the Journal of the Royal Agricultural Society for far more complete and valuable details.

The first question to be decided was the amount of mineral matters abstracted from the soil by the wheat and clover crops, and thus ascertain if the explanation of the mystery was to be found in the results of the analysis. On this considerable branch of the inquiry the Professor remarks :

"By those taking a superficial view of the subject, it may be suggested that any injury likely to be caused by the removal of a certain amount of fertilizing matter is altogether insignificant, and more than compensated for by the benefit which results from the abundant growth of clover-roots and the physical improvement in the soil which takes place in their

decomposition. Looking, however more closely into the matter, it will be found that in a good crop of clover-hay a very considerable amount of both mineral and organic substances is carried off the land, and that if the total amount of such constituents in a crop had to be regarded exclusively as the measure for determining the relative degrees in which the different farm-crops exhaust the land, clover would have to be described as about the most exhaustive crop in the entire rotation.

"Clover-hay, on an average, and in round numbers, contains in 100 parts:

Water	17.0
*Nitrogenous substances (flesh-forming matters)	15.6
Non-nitrogenous compounds.....	59.9
Mineral matter (ash).....	7.5
	<hr/> 100.0
* Containing nitrogen,	2.6

"The mineral portion, or ash, in 100 parts of clover-hay, consists of:

Phosphoric acid.....	7.6
Sulphuric acid.....	4.3
Carbonic acid.....	18.0
Silica.....	3.0
Lime.....	30.0
Magnesia	8.5
Potash	20.0
Soda, chloride of sodium, oxide of iron, sand, loss, &c.....	8.7
	<hr/> 100.0

"Let us suppose the land to have yielded 4 tons of clover-hay per acre. According to the preceding data, we find that such a crop includes 224 lbs. of nitrogen, equal to 272 lbs. of ammonia, and 672 lbs. of mineral matter or ash constituents.

"In 672 lbs. of clover-ash we find—

Phosphoric acid.....	51½ lbs.
Sulphuric acid.....	29 "
Carbonic acid.....	121 "
Silica.....	20 "
Lime.....	201 "
Magnesia.....	57 "
Potash.....	134½ "
Soda, chloride of sodium, oxide of iron, sand, &c.....	58 "
	<hr/> 672 lbs.

"Four tons of clover-hay, the produce of one acre, thus contains a large amount of nitrogen, and remove from the soil an enormous quantity of mineral matters, abounding in lime and potash, and containing also a good deal of phosphoric acid.

"Leaving for a moment the question untouched, whether the nitrogen contained in the clover is derived from the soil or the atmosphere, or partly from the one and partly from the other, no question can arise as to the original source from which the mineral matters in the clover produce is derived. In relation, therefore, to the ash-constituents, clover must be regarded as one of the most exhausting crops usually cultivated in this country. This appears strikingly to be the case when we compare the preceding figures with the quantity of mineral matters which an average crop of wheat removes from an acre of land.

"The grain and straw of wheat contain in round numbers in 100 parts :—

	Grain of wheat.	Straw.
Water.....	15.0	15.0
*Nitrogenous substances (flesh-forming matters).....	11.1	4.0
Non-nitrogenous substances.....	72.2	74.9
Mineral matter (ash).....	1.7	5.1
	<hr/> 100.0	<hr/> 100.0
*Containing nitrogen,.....	1.78	.64

"The ash of wheat contains in 100 parts :

	Grain.	Straw.
Phosphoric acid.....	50.0	5.0
Sulphuric acid.....	0.5	2.7
Carbonic acid.....	<hr/>	<hr/>
Silica.....	2.5	67.0
Lime.....	3.5	5.5
Magnesia.....	11.5	2.0
Potash.....	30.0	13.0
Soda, chloride of sodium, oxide of iron, sand, &c.....	2.0	4.8
	<hr/> 100.0	<hr/> 100.0

"The mean produce of wheat per acre may be estimated at 25 bushels, which, at 60 lbs. per bushel, gives 1,500 lbs.; and

as the weight of the straw is generally twice that of the grain, its produce will be 3,000 lbs. According, therefore, to the preceding data, there will be carried away from the soil :—

In 1,500 lbs. of the grain.....	25 lbs. of mineral food in round numbers.
In 3,000 lbs. of the straw.....	150 lbs. " " " " "
Total	175 lbs.

“On the average of the analysis, it will be found that the composition of these 175 lbs. is as follows:

	In the grain.	In the straw.	Total.
Phosphoric acid.....	12.5 lbs.	7.5 lbs.	20.0 lbs.
Sulphuric acid.....	0.1 lbs.	4.0 lbs.	4.1 lbs.
Carbonic acid.....	.....	.....	.....
Silica.....	0.6 lbs.	100.5 lbs.	101.1 lbs.
Lime.....	0.9 lbs.	8.2 lbs.	9.1 lbs.
Magnesia.....	2.9 lbs.	3.0 lbs.	5.9 lbs.
Potash.....	7.5 lbs.	19.5 lbs.	27.0 lbs.
Soda, chloride of sodium, oxide of iron, sand, &c.....	0.5 lbs.	7.3 lbs.	7.8 lbs.
	25.0 lbs.	150.0 lbs.	175.0 lbs.

“The total quantity of ash-constituents carried off the land in an average crop of wheat, thus amounts to only 175 lbs. per acre, whilst a good crop of clover removes as much as 672 lbs.

“Nearly two-thirds of the total amount of mineral in the grain and straw of one acre of wheat consists of silica, of which there is an ample supply in almost every soil. The restoration of silica, therefore, need not trouble us in any way, especially as there is not a single instance on record proving that silica, even in a soluble condition, has ever been applied to land with the slightest advantage to corn or grass crops, which are rich in silica, and which, for this reason, may be assumed to be particularly grateful for a supply of it in a soluble state.

“Silica, indeed, if at all capable of producing a beneficial effect, ought to be useful to these crops, either by strengthening the straw or stems of graminaceous plants, or otherwise benefiting them; but after deducting the amount of silica from the total amount of mineral matters in the wheat produce of

one acre, only a trifling quantity of other and more valuable fertilizing ash-constituents of plants will be left. On comparing the relative amounts of phosphoric acid and potash in an average crop of wheat and a good crop of clover-hay, it will be seen that one acre of clover-hay contains as much phosphoric acid as $2\frac{1}{2}$ acres of wheat, and as much potash as the produce from five acres of the same crop. Clover thus unquestionably removes from the land very much more mineral matter than is done by wheat. Wheat, notwithstanding, succeeds remarkably well after clover.

"Four tons of clover-hay, or the produce of an acre, contains, as already stated, 224 lbs. of nitrogen, or, calculated as ammonia, 272 lbs.

"Assuming the grain of wheat to furnish 1.78 per cent. of nitrogen, and wheat straw 0.64 per cent., and assuming also that 1,500 lbs. of corn and 3,000 lbs. of straw represent the average produce per acre, there will be in the grain of wheat per acre 26.7 lbs. of nitrogen, and in the straw 19.2 lbs.; or in both together, 46 lbs. of nitrogen, in round numbers equal to about 55 lbs. of ammonia, which is only about one-fifth the quantity of nitrogen in the produce of an acre of clover. Wheat, it is well known, is specially benefited by the application of nitrogenous manures, and as clover carries off so large a quantity of nitrogen, it is natural to expect the yield of wheat after clover to fall short of what the land might be presumed to produce without manure before a crop of clover was taken from it. Experience, however, has proved the fallacy of this presumption, for the result is exactly the opposite, inasmuch as a better and heavier crop of wheat is produced than without the intercalation of clover. What, it may be asked, is the explanation of this apparent anomaly?"

After adducing various analogous facts, the Professor adds: "Taking all these circumstances into account, is there not presumptive evidence that, notwithstanding the removal of a large amount of nitrogen in the clover-hay, an abundant store of available nitrogen is left in the soil, and also that in its relations

towards nitrogen in the soil, clover differs essentially from wheat. The results of our experience in the growth of the two crops appear to indicate that, whereas the growth of the wheat rapidly exhausts the land of its available nitrogen, that of the clover, on the contrary, tends somehow or other to accumulate nitrogen within the soil itself. If this can be shown to be the case, an intelligible explanation of the fact that clover is so useful as a preparatory crop for wheat, will be found in the circumstance that, during the growth of clover, nitrogenous food, for which wheat is particularly grateful, is either stored up or rendered available in the soil." After detailing the results of some most valuable examinations of the composition of a soil on which the clover had been twice mown, and then grown for seed, he continues:

"The total amount of nitrogen accumulated, especially in the surface soil, when clover is grown for seed, explains intelligibly, as it appears to me, why wheat, as stated by many practical men, succeeds better on land where clover is grown for seed than where it is mown for hay.

"All the three layers of the soil after clover-seed are richer in nitrogen than the same sections of the soil where the clover was twice mown, as will be seen by the following comparative statement of results:

	1.—CLOVER-SOIL TWICE MOWN.			2 — CLOVER - SOIL ONCE MOWN & LEFT FOR SEED.		
	Upper 6 inches	21 6 inches	3d 6 inches	Upper 6 inches	Next 6 inches	Lower 6 inches
Percentage of Nitrogen in dried soil,.....	.168	.092	.064	.189	.134	.089
Equal to Ammonia, .....	.198	.112	.078	.229	.162	.108

"This difference in the amount of accumulated nitrogen in clover-land appears still more strikingly, on comparing the

total amounts of nitrogen per acre, in the different sections of the two portions of the eleven acre fields:

	1st. 6 inches.	2d. 6 inches.	3d. 6 inches.
Percentage of nitrogen per acre.....		lbs.	lbs.
*I. In soil, clover twice mown.....		3350	1875 1825
†II. In soil, clover once mown and seeded afterwards		4735	3360 2335
Equal to ammonia:			
*I. Clover twice mown.....		4050	2275 1000
†II. Clover seeded.....		5725	4050 2700
I. Nitrogen in roots of clover twice mown.....		24½	
II. Nitrogen in clover once mown, and grown for seed afterwards.....		51½	
I. Weight of dry roots per acre, from soil I.....		1493½	
II. Weight of dry roots per acre, from soil II.....		3622	
*Total amount of nitrogen in 1 acre 12 in. deep, of soil I.....		5249½	
†Total amount of nitrogen in 1 acre 12 in. deep, of soil II.....		6126½	
*Equal to ammonia.....		6374½	
†Equal to ammonia.....		9667	
Excess of nitrogen in an acre of soil 12 in. deep, calculated as ammonia			
in part of field mown once and then seeded.....		3592½	

“It will be seen that not only was the amount of clover-roots greater in the part where clover was grown for seed, but that likewise the different layers of soil were in every instance richer in nitrogen after clover-seed than after clover mown twice for hay.”

The results at which the Professor, at the conclusion of his paper, arrives, are as follows:

1. A good crop of clover removes from the soil more potash, phosphoric acid, lime, and other mineral matters, which enter into the composition of the ashes of our cultivated crops, than any other crop usually grown in this country.

2. There is fully three times as much nitrogen in a crop of clover as in the average produce of the grain and straw of wheat per acre.

3. Notwithstanding the large amount of nitrogenous matter and of ash constituents of plants in the produce of an acre, clover is an excellent preparatory crop for wheat.

4. During the growth of clover, a large amount of nitrogenous matter accumulates in the soil.

5. This accumulation, which is greatest in the surface-soil, is due to decaying leaves dropped during the growth of clover, and to an abundance of roots containing, when dry, from 1½ to 2 per cent. of nitrogen.

6. The clover-roots are stronger and more numerous, and more leaves fall on the ground when clover is grown for seed, than when it is mown for hay; in consequence more nitrogen is left after clover-seed than after hay, which accounts for wheat yielding a better crop after clover-seed than after hay.

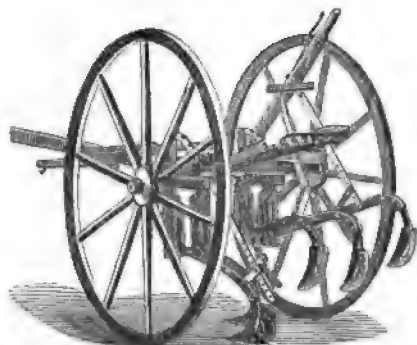
7. The development of roots being checked when the produce, in a green condition, is fed off by sheep, in all probability leaves still less nitrogenous matter in the soil than when clover is allowed to get ripen, and is mown for hay; thus, no doubt, accounting for the observation made by practical men, that, notwithstanding the return of the produce in the sheep excrements, wheat is generally stronger and yields better after clover mown for hay, than when the clover is fed off green by sheep.

8. The nitrogenous matters in the clover-remain, on their gradual decay are finally transformed into nitrates, thus affording a continuous source of food on which cereal crops specially delight to grow.

9. There is strong presumptive evidence that the nitrogen which exists in the air in the shape of ammonia and nitric acid, and descends in these combinations with the rain which falls on the ground, satisfies, under ordinary circumstances, the requirements of the clover-crop. This crop causes a large accumulation of nitrogenous matters, which are gradually changed in the soil into nitrates. The atmosphere thus furnishes nitrogenous food to the succeeding wheat indirectly, and, so to say, gratis.

10. Clover not only provides abundance of nitrogenous food, but delivers this food in a readily available form (as nitrates) more gradually and continuously, and consequently with more certainty of a good result, than such food can be applied to the land in the shape of nitrogenous spring top-dressings.

These examinations I have already commended to the careful study of the reader. They are not only valuable in tending to elucidate one of our great agricultural mysteries, but they are equally so as leading to other important reflections and researches. The very considerable amount of nitrogen found in the soil at a depth far below that to which the plough commonly extends, indicates a fresh reason for the advantages of deep and frequent stirrings of the soil; and, again, the amount of nitrogenous matters added to the soil by this growth of clover will naturally tend to revive the inquiry whether the ammonia and the nitric acid found in minute proportions in our atmosphere, are the only sources from whence that increase of nitrogen to the soil and our crops is obtained.—CUTHBERT W. JOHNSON, in the *Farmer's Magazine*.



PHIFER'S WHEEL GANG-PLOUGH AND CULTIVATOR.

THIS implement received the first prize of the New York State Agricultural Society at the trial at Utica, N. Y., in September, 1867, where competition was unrestricted. The following is an extract from the report of the judges :

"It first operated as a seed-sower, scattering rye very evenly, and covering it with four ploughs running shallow and turning the earth all one way. Next it worked with seven cultivator teeth, throwing the earth in opposite directions. It cultivated two rows of corn, one plough on each side throwing earth towards the corn, and then both threw it away from it. The changes to accomplish these different objects can be made very easily; in NO CASE did it require more than SIX MINUTES FOR THAT PURPOSE. It did all the work, and went through all the tests to which it was subjected in a VERY PERFECT MANNER. It worked close to the corn rows, and by means of the steering apparatus, it could be made to move around a hill or a single stalk which

happened to stand out of line, without injuring it or touching it. It destroyed the weeds very satisfactorily, and it was tested in AS WEEDY A PATCH and AS TOUGH A SOD AS WE EVER SAW. It pulverized the soil as well as could be desired. It is very strong in all its parts, and we think it is not liable to get out of order. The machine is very SKILFULLY CONSTRUCTED, the greatest amount of material being DISTRIBUTED TO THE PARTS WHERE THE STRAIN IS GREATEST. We award the Gold Medal to this implement."

This implement was used on the farm of the Michigan State Agricultural College during the season of 1868, and gave entire satisfaction, from its efficient and perfect operation in all cases.

It is proper to state that some changes have lately been made in the construction of this implement, which are deemed to constitute important improvements. For the frame, wrought iron has been substituted in place of wood and cast-iron, rendering the implement both lighter and stronger. This and various other alterations, were patented in June, 1868. We have not seen the implement in its new form, but the proprietors and manufacturers, Messrs. A. L. Brearley & Co., Trenton, N. J., consider it superior to the form of 1867.

FORESTS.

Hon. J. M. Edmunds, late Commissioner of the General Land Office, communicates to the Monthly Report of the Department of Agriculture, the following paper upon a subject meriting more attention than it has yet received:

The Uses of Forests.—The progress of population and settlement, not only on this, but on the other Continents, has demonstrated the fact that that country only is desirable and practicable as the habitation of civilized man which is clothed with, or is in the vicinity of forests.

Besides furnishing the best and most economical material for the convenience and many of the necessities of civilized society, forests fertilize and moisten the earth, soften and modify the climate, and protect men, animals, and vegetation from the blighting effects of the unbroken rays of the sun, and dry and sweeping winds, which everywhere prevail on extended treeless plains, deserts, or wastes. So marked and universal are these effects, that even the casual observer may trace with accuracy, by the absence or abundance of animal and vegetable life, the line between the rainless regions of the earth and those which are enriched and fertilized by the outpouring of the rain clouds, which in our country, except upon the mountain plateau, everywhere abound.

To the pioneer, forests are a necessity. They supply building material, tools, carriages, fuel,—in fact are the reliance of the frontier settlers for almost all domestic purposes, nor can a substitute be found which is within the means, and accessible to the advance settlements. It is not until the facilities of

economical transit, and the capital and skill of the miner and manufacturer have occupied the country, that the various substitutes for timber, for multifarious domestic uses, can be obtained even by the more opulent, and for the indigent, structures and implements of timber must, under the most favorable circumstances, continue to be the main reliance.

It is true, that for buildings, vessels, bridges, and many other structures, and for machinery, tools and utensils of almost every description, stone, brick, iron, and other expensive materials, have been substituted for timber in the older and wealthier communities; but it is not true that these inventions, numerous and important as they are or may be, have diminished or will lessen the consumption of timber. It must be borne in mind, in this connection, that new uses have been found for timber as well as for its more durable and expensive substitutes; that, while in the older sections of the country its use has been discontinued for many purposes, it has been applied to new and varied uses by a large and rapidly increasing population, and that more, much more, is now annually consumed than at any former period since the settlement of this continent.

If, then, forests are essential for domestic uses, and their consumption annually increasing in the ratio of population; if they are essential for the protection of men, animals, grains, grasses, and fruits, as none will deny, but all admit, what should be done to stay their waste; and what should be the policy of the nation and people relative to their growth and preservation?

Their Waste.—Till within a short period the advancing column of population has been composed of those who have been forced to contend with the densely timbered region east of the Mississippi, carrying with them habits and tastes unsuited to the vast treeless plains now facing our frontier settlements.

Upon the first settlement of the continent communities were weak and scattered, the open prairies of the west were unknown and inaccessible, timber for every purpose was abundant and

free, forests were the great hindrance to progress and cultivation, the immense growth on the Atlantic and western slope of the Alleghanies was disproportioned to the wants of the population, facilities for its transport to the seaboard did not exist, and its destruction was an apparent necessity. The inconveniences of a treeless waste were unknown, and the consequent prospective value of the forests unthought of and unappreciated. For generations the advance settlers continued the war of destruction upon the most extended and valuable forests on the globe. And thus it is, that the whole people of the country, after having been taught that they could not live with the forests, have now to learn that they cannot live and prosper without them.

While the war upon the timber reserve was conducted with the greatest vigor, the population was sparse and poor, yet, after a century and a half of toil it has worked entirely through this almost impenetrable wilderness, leaving but scattered fragments behind, and now, confronting a treeless waste, is forced to draw its supplies of an essential commodity, which requires a century for reproduction, from a diminished and constantly and rapidly diminishing supply, and this for a population tenfold greater than that with which our career as a nation was commenced.

Now, the demand, the need for indispensable forest products, comes from both ways; then it came from neither. Now, there is a vast population to consume; then, there was only a feeble one to destroy. Now, the forest cannot supply the demand for its products without certain prospective exhaustion; then, it did not afford space for settlement and cultivation except through its destruction. Until recently, as new sections of the country were approached by the settlers, new sources of timber supply were opened; now, the country to be peopled is the most destitute, and the advance of settlements but increases the demand upon the already diminished reserve.

Except in the mountain regions, nearly the whole vast surface, from the Atlantic to the Mississippi, has been despoiled

of its primeval forest growth by preparation for and subjection to cultivation; and it is only the inarable mountain lands which have been permitted to produce the forests of which they have been denuded. Even this is not due to the foresight or prudence of the people, but to the poverty of the soil and the obstacles to cultivation presented by a broken surface. Nowhere have the flat, arable lands been left to reproduce the forest growth. The inviting fertility of the soil, the great length of time required for forest reproduction, the avarice of the people, and a rapidly increasing population, have all combined in the appropriation of the land to such uses as promise immediate returns. And such is the policy still prevailing throughout the whole of the lately timbered region.

The absolute waste is less than formerly, but the waste and consumption are far greater than at any former period, and no considerable effort has anywhere been made to produce, nor is any such effort likely to be made until the people meet with actual destitution, and its legitimate accompaniments of sweeping winds, parching droughts, and impoverished or unproductive fields. Fortunately, some of the more advanced settlers on the great plains have already gained this experience, in time, it is hoped, to impress upon the whole country the importance of immediate precaution and action.

It must not be forgotten that, to this time, our forests have met the demands and destruction only of a gradually rising population—from three to thirty-eight millions—which was, for nearly the whole period, driving deeper into an unbroken, primeval supply; whereas the people have now gone through and surrounded this great timber reserve, and already entered on the margin of the vast treeless plains and plateau, with three-fourths of the original store consumed, the demand accelerated, and the number of consumers rapidly rising from 38,000,000 to 50,000,000. Only a simple mathematical calculation is necessary to determine the proportion which the demand and supply will bear to each other at the close, as compared with the commencement of this century.

Extend the time for another 50 years, with the added population, and our forests will be exhausted, the demand for their products quadrupled, and the country and people suffering for the protection which forests would afford.

Maine, Michigan, Wisconsin, Minnesota, and Florida are the only States east of the Mississippi which now export any appreciable quantity of timber more than they import, and the reserve in these States is being rapidly cut away to supply the markets from the Atlantic to the Rocky mountains, and from the great lakes to the gulf. But a few years will elapse before the reserve in these exporting States will be reduced to, or below, the demands of their own people.

The mountain and plateau region, occupying the interior of the continent, has only a moderate supply in the valleys and gulches, and upon the foot-hills and lower mountain elevations. No supplies can be drawn from this region for the older States, or even for the great plains, without exhausting a reserve which is already below the immediate prospective demand.

In the Pacific States and Territories there is still an adequate supply, but not beyond the early prospective wants of their own people. The States bordering the Mississippi on the west have no surplus, and most of them are at this moment importing to meet the demands of even their sparse population. What sources are they to draw from when the number of their people shall be doubled, and the forests of Michigan, Wisconsin, and Minnesota shall have been exhausted—events which will occur at or about the same time?

Arizona, New Mexico, Colorado, Wyoming, Montana, Idaho, and Dakota, have but a meagre supply, not sufficient for a population as dense as now occupies Ohio, Indiana, or Illinois.

Only the newly acquired Territory of Alaska remains to be considered. Very little is known of its timber resources, but in much the largest portion it is known that its rigorous climate precludes the growth of valuable forests, and it is not too much to presume that the timber in that Territory will be

insufficient to meet the demands of the trade now opening with the great populations of China and Japan.

Considering, then, the present and prospective forest products in this country only in the light of their necessity and economy for domestic purposes, is it not time that waste should cease and production begin? But considering forests and their effects as essential to the protection of men, animals, fruits, and grain, and their value in inducing moisture, protecting the soil and tempering the climate, is it not doubly important that every section of the country should retain if it has them, and if it has them not, should immediately engage in their production, at least to the extent of supplying local use and protection?

Their Preservation.—The growth of forests is a slow process, and promises appreciable returns only at a distant period, but their preservation may be entered upon at once, not only without cost, but with immediate advantage. And this is perhaps all that would be required in the whole of the recently timbered region east of the Mississippi. In all this region wanton destruction should be immediately stopped, and upon all lands not required for cultivation, the spontaneous growth of timber should be permitted and reproduction should be encouraged; and, if need be, commanded by protective statutes. In all the mountain ranges, on abrupt hill-sides, along the borders of streams, lakes, and water-ways, in swamps, surrounding every farm, in every village, around every rural cottage, school-house, and church, on the sides of every highway, and railroad, in every cemetery, and on public parks, squares, and grounds, the growth of forest trees should be promoted by their protection, and by planting where they do not spontaneously spring up.

These precautions alone would save the country from the fearful effects of the absence of forests. They would afford protection from destructive winds and shield crops, animals, and soil from the burning and unbroken rays of the sun, and would, in a brief period, answer a part of the demand for

domestic use, and to that extent relieve the scanty remains of the original reserve from the increasing draught of a growing population.

But one additional measure of preservation and growth might with advantage be adopted, and that is to devote a larger area to the planting or reproduction of forests, and take compensation by the superior cultivation of the diminished surface. There are few cultivators who would not doubly gain by the adoption of such a policy.

The construction of railroads and railroad machinery is a heavy draught on the timber reserve, but this is more than compensated by the ready and economical transit which these roads afford for the products of the coal mines from the interior to the centres of population and mechanical industry. And as an additional means of shielding the timber reserve from exhaustion, the most effective will be the construction of railroads from the densely populated regions to the coal deposits, and operating them upon a principle which shall so cheapen transit as to induce the substitution of coal as fuel, not only in the manufacturing districts, but in the well-peopled agricultural sections. But on the great western plains and plateau, now practically destitute of both forests and people, a system of planting and production must be early commenced, or the advance of population into that region will be materially retarded. It must be shown by experiment that forests will grow and that they will afford the protection, and induce the moisture essential to agricultural prosperity, and this before settlers will incur the discomforts and hazards incident to their absence. And here we are brought to the consideration of the possibility of clothing these naked plains with life-giving and perpetual forests, and the measures which will best and soonest accomplish that desirable and essential end.

Their Growth.—In all of the States east of the Mississippi it needs but that the hand of destruction shall be stayed, and that a sufficient area shall be set apart on which forests shall be

permitted, and their growth protected; for on almost every acre the roots or germs necessary to reproduction still exist and where they do not, the ground will be readily seeded from the adjacent forests. The fertility of the soil, and the moisture of the climate, superadded to these local advantages, would, with the simple permission of man, very soon reclothe the waste fields and places with abundant forests, which would prove a source of wealth and comfort to succeeding generations. Why, then, shall this policy not prevail? Why shall it not be embraced by the people, and sanctioned and encouraged by statesmen? Certainly no subject is more worthy the attention of both, and no great measure of public economy can be entered upon with so little inconvenience, without cost, and which promises such incalculable advantages in the future.

The Plains and Plateau.—The great treeless plains within the United States and Territories, and between the Mississippi on the east, and the Pacific on the west, present an untimbered surface of 1,400,000 square miles; and even this estimate is deemed too low by the most careful observers. It is upon the basis that, in that region, skirting the water courses and within the mountain ranges, there are 600,000 square miles not wholly without timber, which is probably true, but it is equally true that at least one-half this surface, 300,000 square miles, can furnish but a very meagre supply, and that of an inferior quality.

It will be seen that the totally destitute surface in the timberless region, exceeds by more than 400,000 square miles the whole of the once heavily timbered section through which our people have passed.

Having considered what may be done in the latter region towards the protection and reproduction of forests, the inquiry as to the timberless section only remains to be answered. Certain it is that it must, to some extent, be supplied with forests, or it cannot be successfully and densely peopled. Is

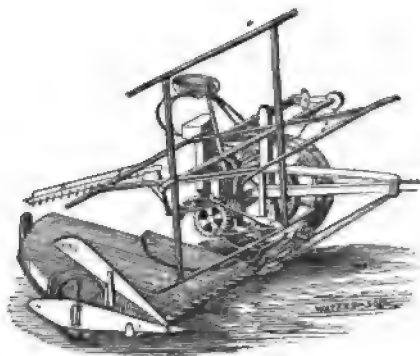
this practicable? It is practicable, and for the following reasons:

1st. Except in the volcanic regions, which occupy but an inconsiderable surface, the soil is everywhere fertile and productive, and contains all the necessary food for plants and forests. Along the mountain ranges and the border of streams and lakes are fringes of timber, protected from the annual fires which devastate the plains by the moisture from the water-courses and melting snows.

2d. These belts of timber demonstrate the adaptability of the soil and climate to forest productions, and will strew the adjacent plains with plants and seeds, which require only protection to become forests, in their turn furnishing plants and seeds for the circle thus enlarged, and bringing moisture to protect and quicken their growth. Thus, by the simple process of protection, forests may be gradually extended over the great plains, from all the mountains and water-courses bordering on, or traversing these naked wastes. By ploughing large tracts in the vicinity of these timbered belts, and leaving the upturned soil uncultivated to receive the seeds scattered by the birds and wind, the growth of forest plants would be aided and multiplied to an indefinite extent, and thus millions of trees might be grown in place of the hundreds which now struggle up through the unbroken prairie sward.

3d. To the extent that planting has been intelligently performed on the plains, the production of forests has been a success. Trees to the number of millions have been produced from the seed of almost every forest species, by the unaided efforts of a single association in Nebraska; and individual settlers, for the protection of their homesteads, orchards, and crops, have planted with success, though upon a limited scale. Enough, however, has been accomplished to demonstrate the feasibility of clothing the plains with forests by individual and associated efforts.

With these facts and suggestions, the necessity and utility of forest preservation and culture are submitted to the American people, and especially to that portion of them engaged in agricultural pursuits, as measures of paramount importance, and demanding their immediate and considerate attention, and decisive action.



THE "NEW YORKER" REAPING MACHINE.

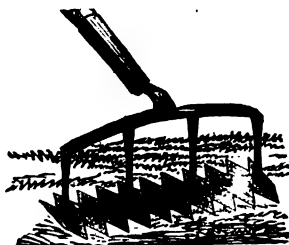
This machine, manufactured by Messrs. Seymour, Morgan & Allen, Brockport, N. Y., received the first prize as a self-raking reaper, at the trial of the New York State Agricultural Society at Auburn, N. Y., in 1866, where competition was unrestricted, and where thirty reaping machines were entered for trial, eight of which were self-rakers. Some of the self-rakers performed better in the various circumstances in which they were tried, than any of the hand-rakers. In the scale adopted for "quality of work," the mark of 40 denoted perfection. The work of the "New Yorker" was marked in standing wheat, 39; in lodged wheat, 38; in rye, 40; in barley, 40. In reference to the performance of the machine in rye, the judges, in their report, said: "There was a high wind acting on the tall rye; but the gavels were laid in the most admirable manner, as was witnessed by the judges and the numerous spectators." In summing up the points of value possessed by the competing

machines, the judges said: "Seymour, Morgan & Allen have, therefore, a decided preponderance in the qualities which constitute a valuable self-raking reaper. * * * * We therefore award the Gold Medal in this class, to Seymour, Morgan & Allen, for their 'New Yorker,' especially with reference to its superiority in adaptation to various kinds of grain, and to varied circumstances of wind."

The "New Yorker" was used in the harvest of 1868, on the farm of the Michigan State Agricultural College, and fully sustained the position given it at the trial above alluded to.

ALLEN'S WEEDING-HOE.

The cut accompanying this article, represents a weeding-hoe, invented and patented by Geo. P. Allen, of Woodbury, Connecticut. A very good idea of the implement may be obtained from the figure. It will be noticed that the zigzag edge greatly increases the cutting surface. It is more especially designed for garden work, and is used by pushing and drawing at just such a depth from the surface, as will most effectually destroy weeds. The blade is made of different sizes and lengths to adapt it to different kinds of work, or, more especially, the varying width of spaces between rows of vegetables,—as onions, carrots, turnips, &c. It has been used in the garden of the State Agricultural College, and found to be a decided improvement over hoes previously used for weeding, being worked with more ease, and doing at the same time better execution.



THE REARING AND MANAGEMENT OF POULTRY.

It is the writer's aim to make this essay as plain and as brief as possible where details are given, that it may be suitable to the requirements of any one desirous to obtain a practical knowledge of the management of poultry; since it is the fruit of long and careful experience, gained by daily practice, it is not too much to hope that similar results to those that attended the labors of the writer, may also requite those who may feel disposed to follow the advise herein laid down.

It is intended to point out the best system with regard to the breeding, rearing, and general management of poultry, more than to dwell upon and describe the different breeds, of which so many works now treat.

There are few creatures that conduce more to man's comfort than domestic poultry, whether he be in health or sickness; and, considering how interesting and profitable is the occupation, it is astonishing how few young people there are who make poultry their study, or even bestow on it the attention it would so well pay. What a lesson of industry, vigilance, patience, perseverance, care and affection, may be learned from the parent hen that "gathereth her chickens under her wings!"

There is no doubt that poultry may be kept and managed so as to produce a profit on all farms where grain and potatoes are grown, as the light or inferior grain cannot be sent to market in a more profitable shape than as well-fed poultry; but like all other farming stock, it requires constant care and attention; and, if you expect a full remuneration for your trouble, you must adopt a good system of management, and see that it

is properly carried out in all points, from first to last. I do not think it would pay upon a small farm to keep a regular paid attendant; that occupation must be united with other employment, unless it is managed as a business, and first-class poultry is bred and kept for exhibition, so that fancy prices can be obtained. Any sharp lad can, under proper directions and occasional supervision, look after and feed adult poultry; but to breed and rear successfully, requires some experience. One would not think of trusting sitting birds or their young to youth; they require watching closely to keep the different broods steadily thriving; any check at this stage is a wasteful loss of time, and invites disease, whereas prevention is more important and more easily attainable than cure. The coops and sitting-house should be near the homestead, so that the farmer's wife, daughter, or, at all events, a confidential servant may, without much loss of time, attend to those two principal points, thus getting a nice change from the sameness of in-door occupation.

Breeding.—Where there is defect, there is commonly a cause which may be traced out; and such is the case with breeding poultry. One of the greatest hindrances to rearing, is unskillful breeding. How frequently do we hear of large numbers of the young dying without any apparent cause; but I generally find on inquiring into such cases that they have been bred from old birds, and without any infusion of fresh blood for years, or that pullets' eggs have been used; in which case, should there be chickens they are weak and delicate, and seldom attain perfection.

I keep five breeds of fowls: Gray Dorking, Brahmapootra, Game, Spanish, and Moonies, [often called in America, Bolton-Grays,] and breed all the year round. For stock fowls I select the very best birds of the different breeds, and mate them according to age, and with due regard to consanguinity; that is, of the same age, if two years old, or hens one year old, and cocks two, or *vice versa*, taking care that they are not too near akin, and that fresh blood be introduced on one side at least,

every two years, and never allowing more than five hens to one cock.

My early and late chickens for table purposes are bred from the Gray Dorking hen, by a Game cock, and the Brahma-pootra hen by a Dorking cock, mated as aforesaid, which two crosses will answer the most sanguine expectations; and those who do not care to keep a pure breed, cannot, I believe, select more valuable fowls. They are not to be excelled as parents, layers, or sitters: their eggs are large, and the birds very good for the table. I have not the least difficulty in rearing chickens from any of the above named breeds, and feel convinced that success depends on the breeding and feeding.

I find that the cross-breds stand the winter months better than the pure-breds, and, therefore, prefer the former to the latter, because of the high prices they will command at that season of the year. The question is often asked, "What kind of fowls will pay the best to keep?" The answer depends entirely upon the purpose for which they are chiefly kept. If for laying purposes, I prefer the Moonies, having had pullets of that breed which have laid for twelve months, without missing more than two days a week. They are a good-sized fowl, and handsome withal; but as table fowls, I should make choice of the Dorking or Game, or the cross-breeds, before alluded to.

The Hatching or Sitting-House.—To some persons it may seem quite absurd to think of setting hens where they have not been accustomed to lay; but "where there's a will, there's a way." The sitting-house is really a most important apartment, necessary to insure the successful hatching of poultry; for how frequently do we see hens spoil their eggs by forsaking their nests when they are allowed to sit where they are hourly interrupted, and, perhaps, driven off their nests by other hens wanting to lay. To prevent all this, a separate apartment is required for sitting hens. It should be divided into compartments, of sufficient size to contain a nest for one hen, and so arranged that the hen can be secured on the nest by a lattice

door, allowing plenty of air; or the following plan may be adopted: The nests, 14 inches wide, 14 inches high, and 16 inches from front to back, may range in two tiers along the lower part of a house—8 or 10 feet by 6—each nest being provided with a loose wooden door, reaching within three inches of the top, so as to admit of ventilation, at the same time the hen is secured on the nest; the door when closed is fitted into a groove at one end and fastened with a wooden button at the other; each button fastens two doors, and each door is numbered with paint, the corresponding number being painted on the *facia* of each nest.

I never set less than three hens at one time, and that number may always be had broody in the course of a week or ten days by leaving a few spoilt eggs in the nests where the hens you wish to set are accustomed to lay. The broody hens should be managed thus: During the day make as many nests as you require in the sitting-house, with clean, soft, bruised straw, underneath which, during the summer months only, place a green sod; when evening arrives, place the broody hens thereon, and put under each hen three or four trial-eggs, (which should be kept for the purpose marked with ink) taking care to handle the hens dextrously, placing one hand underneath the breast, holding the legs in the other hand, and carrying them upright; otherwise, have a convenient basket for the purpose. Feed the newly-set hens as usual with the others, and in all probability at the end of two days they will have taken to the nests; in which case, when off feeding, on the third morning, place the eggs for sitting under each hen, and label each nest naming the kind of eggs, and date when set. On the evening of the eighth day after setting, take a lighted candle, and, holding the eggs up to the light, observe if they appear quite clear; if so, they are sterile, or addle, for eggs containing birds will appear opaque. It may happen, should there be many addle eggs, that two of the hens will sit the remaining eggs of the three; and one can again be set with fresh eggs, as before, and so on during the year. The sterile eggs should be marked as trial

or nest-eggs, or boiled as food for chickens, so that none need be wasted. As each sitting hen is now secured upon her nest, as many only at a time as may be most convenient can be let off to feed, which should be done every morning inside the sitting-house with closed door, allowing them to remain off the nests fifteen or twenty minutes, and taking care that each hen returns to the proper nest. Give water with grain in its natural state, but not with soft food. During the summer months, or dry windy March, and about a week previous to hatching, take a little warm water, and when the hens are off their nests, sprinkle the eggs therewith. This will greatly assist nature in the process of hatching, as the eggs are often very dry in hot weather. As a rule, this applies to all kinds of poultry.

Feeding.—It is neither necessary nor desirable to go into the market for expensive feeding-stuffs; still, there are several kinds of food not grown upon the farm which are yet cheap and useful in the raising of young poultry, or putting in condition birds intended for exhibition. One of the cheapest of these, if properly prepared, is rice. It can frequently be bought at 1½d. per lb., or even less. Preference should be given to the small grain, or fine rice, which should be prepared in the following manner, viz: To 6 quarts of boiling water, add 2 lbs. of rice, and let boil for 10 or 15 minutes, according to the size of the grain; when sufficiently boiled, pour it into a hair seive, and when cold, mix with as much oat or barley meal as will, when stirred lightly round with the hand, give it the appearance of well-dusted pills; each grain being then separate, it will be very convenient for, and is greedily devoured by young birds, and being very digestible, is an invaluable food for them.

Another kind of food is prepared by boiling two or three eggs until quite hard, afterwards chop fine, adding two or three handfulls of stale bread-crumbs; mix well together, so that one cannot be eaten without the other. This may be thought expensive food, but as the consumption by young birds is at first very small, I always consider a little extra

keep is not thrown away on them; you are forcing and growing birds that will repay you for all at no distant date.

Another description of food is Indian and barley meal, in equal quantities, slaked with boiling water or milk, and served cold; it cannot be surpassed as food for small chickens, and answers admirably, given alternately with the rice and egg, prepared as aforesaid. The youngest chickens I keep near the house, and feed very sparingly every two hours throughout the day, giving little or no water, as I find over-drinking spoils the appetite and brings on indigestion, which generally terminates in death. As soon as they grow and become strong, they should by degrees be put upon the same food as adults, and any that promise to make prize birds, are then transported to a run specially kept for the purpose, to which, of course, a little extra food is carried.

The adult poultry I feed twice a day with light wheat, oats, or barley, given alternately with boiled potatoes, or turnips mashed up with ground oats or barley, and I will guarantee this food to keep them in good condition, and to produce plenty of eggs. Care should be taken in not supplying more food than is eaten, otherwise much may be wasted, as is often the case; and I think if profit be looked for, more poultry should not be kept than can be conveniently and well cared for and fed with the produce of the farm, except as I have before mentioned, in reference to young birds or those intended for exhibition.

TURKEYS.

These birds are not troublesome and difficult to rear, as is generally supposed; and taking into consideration the present prices, it is a question if any of our domestic poultry are more profitable. It is not uncommon for a pair of turkey hens to rear thirty young ones during the season, which, at an average of 12s. each, are worth £18.

There are several varieties; the most useful and profitable being the Norfolk, or black, and the Cambridge, of metallic

hue; in size and beauty the latter is preëminent. Never keep either male or female for breeding purposes beyond four years; neither depend entirely upon year-old birds. On a farm of ordinary size, three hens and one cock will be found a sufficient number with other poultry. Take care to introduce fresh blood in your stock occasionally, from the best birds you can procure; and it is a wise precaution to keep on a young cock and a couple of hens as late into the season as may be convenient, for fear of loss or accident to your stock birds. Turkeys should be provided with an apartment to themselves, with perches, and fitted up on the ground-floor, with separate nests, so that each bird, when sitting, may be secured on her nest, otherwise, on hearing the young at the time of hatching, they are apt to leave their own nests and interrupt each other, perhaps leaving some of the eggs to perish. As the laying season approaches, place clean straw in their nests, with an egg by way of encouraging them to lay at home, as they are often inclined to lay astray, to the great danger of losing their eggs. If the hen be seeking a nest, confine her in the place you wish her to lay; where the first egg is dropped there will she lay the remainder.

If fed alike, they will generally all be broody at or near the same time; should this not be the case, the first broody hen must be detained until the others are ready,—that is, supposing you wish to have a second flock, as hereafter described,—then place a green sod at the bottom of each nest, with plenty of clean, short straw thereon, and allow the hens a day or two to form and take to their nests. The time of incubation is four weeks, and the hen will sit seventeen of her own eggs, if it is not intended to add a few common hens' eggs, at the expiration of the first week's sitting, which is often done, with a view to the chickens encouraging the young turkeys to feed at the first onset. The sitting hens will require food and water daily, for which purpose they should be allowed to come out of doors, as they will not remain off their nests for a long time, but it should be observed that they return to their proper nests.

About a week before hatching, sprinkle the eggs with warm water, as directed in reference to chickens, and on the actual arrival of the period of hatching, ascertain, by feeling under the hen, whether the eggs are chipping, or any birds out; if so, after taking out the shells, if any, leave her undisturbed for the day. It sometimes happens that an egg, being slightly damaged, it is requisite that a portion of the shell should be very carefully removed, to allow the escape of the little prisoner, which otherwise might perish. With these exceptions, the turkey, like all other birds, is best left alone. The birds being now all hatched, allow them to remain about a day with the mother in the nest, and on the following, weather permitting, place the hen under a roomy coop, with boarded bottom, and selecting a dry and sheltered spot, turn out the young birds in front thereof, feeding them, whilst small, every two hours with a little hard-boiled egg, alternately with other food, as before mentioned, not forgetting to give the mother a substantial meal, after which she will soon gather the little ones under her wing. Should the weather be wet and cold, they must be kept under cover, and if confined beyond a week, a few onions, chives, dandelion, or dock leaves must be chopped up and given with the egg; but this is not necessary when the mother and young can have their full liberty in about a week after hatching, in which case they will select their own vegetables, and forage for themselves better than they can be fed by hand. Give water in dry weather after the young are a week old; but until they are three weeks old, do not allow it to remain by them after feeding. As they become strong, feed four times, and by degrees come to three times a day with grain or other food. It is a critical time for young turkeys when the fleshy tubercles begin to appear on the head, generally termed "striking the red," the birds being then about the size of a pigeon. The surest safeguard is regular and wholesome food. I have known them to perish in a thunder-storm. To avoid this, a temporary shed should be erected at the spot to which you wish them to resort, near which they should be regularly fed,

and water placed for them to drink. It is astonishing how quickly they will then seek its shelter on the approach of a storm. If turkeys be fed as herein advised, they will be found in sufficient condition for the market, without confining them for the purpose of fattening, as is often done.

I do not think it is desirable to aim at rearing two flocks in one year, but rather to use your best endeavors to raise one first-rate flock; the hens will then be in better condition for early work the following spring. The second hatch is generally very delicate, and subject to great mortality if the weather is at all unfavorable; however, in some establishments it is almost imperative to have a supply of late-hatched turkeys during Lent, and after the game season is over, in which case, and when the first flock is hatched, confine one hen—giving all the young to the others—in a coop or other convenient place for several days, feeding her well; afterwards set her at liberty, allowing the cock to accompany her. She will soon commence to lay again, and probably have her second flock hatched, and the birds will have attained strength ere the cold weather sets in. They nearly always lay twice and sometimes thrice during the season, and the desire to sit is very great; but by confining them a short time and feeding them well, you may easily put them off, without resulting to the uncouth way of plunging in cold water, as practiced by some persons.

There is no doubt that the rearing of turkeys is highly remunerative, and could be profitably extended if circumstances permitted; but if the corn-fields and mowing-grass are near the homestead, I should not advise keeping too many, as a difficulty may be experienced in preventing their doing considerable injury to such crops, unless there be a conveniently situated pasture-field or plantation (woods) to which they could be taught to resort.

GEESE.

Geese, like turkeys, are some of our largest edible birds, and second to none in value, considering the very little trouble they give from first to last, their usefulness upon the table, and

the luxurious down and feathers which they supply; but a good-sized pond, with a plentiful supply of water and good pasturage, are indispensable to make geese-keeping a paying business, for they are very large consumers.

The Toulouse are the largest breed, and as size is an object in the goose, care should be taken to select fine birds. This breed seldom attain full maturity for breeding until three or four years old. Let them have an outhouse to themselves, regularly supplied with clean straw, with which make nests, on the floor, as the laying season approaches, and partition the nests off, according to the number required. One gander will be sufficient for three or four geese. When arrived at maturity, they generally lay about twelve eggs each, which number they will sit. The eggs, for safety, should be collected daily and placed in bran, with the narrow end downwards, until the geese, by remaining on their nests, show their desire for sitting; the eggs must then be placed under them, and the house so arranged that they can have free liberty of egress and ingress at all times of day, as they will require food and water daily, to which they will help themselves, if a pasture-field and pond of water be near, and afterwards return to their nests; little attention is therefore required whilst they are sitting, beyond keeping their nests undisturbed and protected from vermin. When, after four weeks, the time of hatching has arrived, in case any young birds are out, see that the shells are all removed, for fear they may cap the other eggs, and thereby prevent their hatching. Allow the goslings to remain in the nest for a day and night; they will not require feeding during that time, but will gather strength; and if the following morning be fine and sunshiny, they can be moved at once upon a grass-plot or other convenient place, where they will be safe, and supplied with an abundance of nice young grass, of which they will soon partake. This, their natural food, suits them much better than to be crammed with pellets of meal. Forget not to place some water in a shallow vessel, in which a little oat-meal may be mixed, for them to drink. If the weather is unfavorable, they

must be confined in an outhouse, and plentifully supplied with grass-turf, and water. Pellets are sometimes made of oat-meal, formed into paste with cold water, and of convenient size to be swallowed by the goslings; five or six are given at one feed for each bird; but to cram fifty goslings three times a day for a fortnight, will be found a long and tedious job, and in most farm-houses time cannot be afforded for the purpose; besides, it is really not requisite.

The most critical time for young geese is about midsummer; if it is very dry weather, and the pasturage and water not plentiful, it is then desirable to give them a few oats night and morning to assist nature over this peculiar juncture, and help them on until the stubbles are ready for them, and when those are cleared they will be in nice condition for fattening; which is best done by making them up in lots of ten or fifteen in number, according to the size of the place, supplying them with plenty of water and an unlimited quantity of oats for three weeks, giving them a clean bed of straw when required; they will then be ready for the market. The day previous to killing, turn them on the pond for the purpose of washing their feathers, and supply a bed of clean straw in the feeding-house before their return; but take away all food and water, and let them fast until killed the next day, when they must be dressed for the market. It is unwise to sell *green geese*, on account of the loss in the feathers, as well as in the carcass, unless a fancy price is obtained for all together; but not sell by weight at an ordinary price. There is not the slightest doubt that geese pay well where there are proper conveniences for keeping them, but they must be well managed, and kept out of the mowing-grass and cornfields, or they will soon do damage to the amount of double their profit.

DUCKS.

There are many varieties of ducks, but the two most profitable and best suited to the farmer are the Aylesbury, a white duck, with flesh-colored bill, and the Rouen, which should be

exactly like the Mallard in feather, though much larger in size. Both kinds are equally good, and gain great weight if properly bred and fed, and well supplied with water; they will weigh 16 or 17 lbs. per couple at eight months old. In breeding for the market, ducks are best hatched under the common hen, and kept off the pond; they thrive better without access thereto, and are fit for the table at eight weeks old; but those intended for store should have plenty of water, and be provided with a house, furnished occasionally with straw and nests prepared, and if regularly fed they will become attached to their abode; otherwise they are apt to ramble, especially if there is a brook near, in which case many eggs are lost. They commence to lay early in the spring if well fed, and, if not allowed to sit, continue laying until autumn. It is very desirable to have a good supply of early and late broods, which always fetch a high price. There is very little trouble in rearing ducks, whether the eggs are set under the common hen, as before mentioned, or under the duck; the time of incubation is one month. Let the ducklings, when hatched, have a good nesting for about twenty-four hours; afterwards clip off the down of the tail to prevent their being drabbled; then place them with their mother in a coop, and feed with coarse barley-meal, to which water is added, making the food quite sloppy; afterwards give Indian-meal and bran mixed up with buttermilk, so as to form a proper consistency, occasionally adding a few boiled potatoes by way of a change; and as I have before stated, they will be ready for market in eight weeks, which is the chief end to aim at to get them into money as soon as possible. Early ducklings are generally sent to market in the feathers, but if kept over two months old, it is better to dress them, on account of the feathers which are nearly, if not quite as valuable as those of the goose; and the duck, when dressed, is more convenient to the buyer, consequently, will command a better price.

GUINEA-FOWLS

Are useful and handsome birds, and are in season during the months of February, March, and April; they lay a great quantity of eggs during the summer, but being of a wild nature, they generally lay astray, consequently their eggs are sometimes lost. Their flesh is of very game-like flavor, and, coming in after the game season, they are useful for the table; their eggs are small, but fine-flavored, and always worth the same price as common hens' eggs. It is the best way, in case of breeding, to set the eggs under the common hen, the time of incubation being one month. After hatching, place the hen under a coop, around which fix a guard to prevent the young from straying, as they are very wild. They may have the same food as young turkeys. The coop, which should have a boarded bottom, will require to be removed to fresh ground every other day, at least. After the first week the young birds should be shut up within the coop, to avoid injury while being removed. They may have their liberty when three weeks old, but the mother should be kept in the coop a week longer. The young will by degrees become tame, and good foragers, and little difficulty will be experienced in rearing them under this method; but they are troublesome among other poultry, being regular attendants, however well-fed, at the chickens' coops, besides being very quarrelsome, often driving the most spirited cocks before them, and perhaps injuring them in some way. From these remarks it may be inferred, according to circumstances, whether it is desirable to keep them or not upon an ordinary farm. As many males as females are required, as they always pair. The spotted variety is the hardiest; the white are very delicate.

PIGEONS.

There being so little trouble with these birds, it is always desirable to keep a few at most places; they are always readily sold, and are in great demand when game is out of season and spring chickens are scarce. For breeding purposes they should

not be kept too old; a convenient way of denoting their age, is to cut off the nail of the claw every year. A good cote with separate nests should be provided, and kept scrupulously clean, and a plentiful supply of rock-salt afforded. For the table and profit, the Blue Rocks are preferable to most other breeds; one pair will produce ten hatchings during the year. Feed regularly but scantily, as they will find the greater portion of their food.

EGGS.

Eggs should be gathered daily; in fact, whenever they are to be found, for fear of loss or accident; those from select poultry should be placed in bran, with the narrow end downwards, marking thereon the date, as the preference is always given to the freshest eggs for setting, though they will keep good for three weeks, and if you have more than required, they may be sold at a good price. But ordinary eggs should be sold only when dear, and preserved when cheap, in the following manner: If there are many, procure a tub that will contain, say 40 gallons, which place in a cellar, or other cool room, and put therein one bushel of quicklime, two pounds of common salt, and half a pound of cream of tartar; then add thirty gallons of cold water, and stir round a few times to mix the ingredients; afterwards leave until the following morning, when again stir up all well together. It should then be of such a consistency that an egg will float on the surface. Another vessel of convenient size must now be provided, in which the eggs are to be preserved, packing them close together, with narrow end downwards, adding as much of the prepared liquor as will just cover the eggs. This must be done day by day until the vessel is filled within three inches of the top; then fill up the vessel with the liquor, and in a few days a crust of ice-like appearance will be formed over the surface, so as to keep it perfectly air-tight. Eggs, if fresh, preserved thus will keep as long as required, and for all cooking purposes, will an-

swer as well as the freshest, from which they can scarcely be distinguished. Having practiced the system for years, I will guarantee it to have the desired effect, if properly carried out. Where labor is a consideration, eggs may be managed so as to pay better than raising fowls, as far less time and attention are required with laying hens; but the non-sitting varieties should generally be kept, though others will be required to produce early chickens, which must furnish the fresh eggs for the breakfast table during the winter months.

CONCLUSION.

No given rule can be laid down as regards the keeping of poultry and its profitable extension on an ordinary farm, as so much depends entirely upon the conveniences and attendance—whether the latter can be performed by a member of the farmer's own family, whose time is not otherwise profitably employed, or whether it can be had at a reasonable rate; if not, a large number will have to be kept to produce a profit, after paying for special attendance; but if poultry of all descriptions are kept in large numbers on too small a space, the ground becomes tainted, and disease and death make their appearance among them. Poultry in some hands flourish and pay wonderfully well, whilst in others it is just the reverse. All depends on the care, skill, and attention bestowed in the management.

For the satisfaction of the reader, I will state the produce and value for one year of my poultry, as regards the female stock managed as herein stated. In some instances fancy prices were obtained, and prizes taken on exhibition, which, of course, are included in the value. No account of the quantity of food consumed was taken, as I had no intention of offering a statement to the public. It was, however, all grown on the farm except the worth of about £4:

One hundred and four hens produced 13,739 eggs, exclusive

of those set; they reared 372 chickens, besides hatching the ducks and guinea-fowls.

Five turkey-hens reared 74 young.

Six geese reared 58 goslings.

Ducks hatched under hens, 42. Reared and sold.

Attendance—a boy and myself.

Total value of the above, £190 17s. 8d.

N. B.—Seven store ducks kept; the guinea-fowls were the produce of one pair.—*Prize Essay of Mrs. F. SOMERVILLE, in the Journal of the Royal Agricultural Society.*

HISTORY OF THE MAUCHAMP SHEEP.

[As long ago as the time of the first International Exhibition, held in London in 1851, some wool sent from France by Jean Louis Graux, attracted great attention from its peculiar properties, being fine in staple, long, and silky. Mons. Graux claimed to have originated a breed of sheep producing this singular description of wool, and a Council Medal was awarded to him, at the Exhibition. Since that time, through the efforts of M. Graux and others in France, the "Mauchamp-Merinos,"—as the sheep which bear this silky wool are called, from the name of the farm where they originated,—have been greatly increased, and the wool seems to be highly esteemed for the manufacture of certain kinds of fabrics. The history of this breed of sheep must be interesting to every one who desires to become acquainted with the laws involved in the production of animals of peculiar characters. The following essay was translated by John H. Klippart, Esq., Secretary of the Ohio State Board of Agriculture, from the French of Mons. Yvart, Government Inspector of the veterinary schools and national sheep-breeding establishments of France. It will be found to contain much valuable matter in reference to the principles of breeding, and the proper points of animals, as connected with their adaptation to various purposes.]

For some time past the sheep-growers as well as the manufacturers have felt a deep interest in the creation of a new breed of sheep known by the name of MAUCHAMP MERINO. Some persons consider this breed as one which is to produce a wool so

precious that it will take the place of Cashmere; others suppose that this type will not perpetuate itself, and will not be of any practical usefulness. Observations made upon several flocks, induce me to believe that, if the rams of Mauchamp cannot yet be used to produce the wool economically which has some resemblance to the down of the Cashmere, they can in any event improve some fleeces very greatly which are used in manufactures.

To demonstrate how I arrived at this conclusion, I will endeavor to show that there exists two sorts of merino wool which, with regard to the purposes for which they are employed, must necessarily be of different qualities. I shall endeavor, in the next place, to show what the Mauchamp breed now is, and what it may become when intelligent care shall have been bestowed upon it for the purpose of improving it. I will show how it may hereafter and henceforward become an essential ingredient for the improvement of a part of our woollens. This memorial will lead me to make a comparison in some respects of the sheep of English origin with the sheep of Spanish origin, in order to remove any existing doubt with regard to the Mauchamp breed. I shall also be obliged to say a few words on the different methods pursued in Germany and in France in the breeding of ovine animals; but these digressions will not divert me from the principal subject I have in view to discuss. The merino breeds are distinguished, amongst the various *types* of the ovine species, by the fineness of their wool and the abundance of their fleeces. Introduced (imported) from Spain into France at the close of the last century, they were not long in becoming the source of great profits, for the reason that the French manufacturers supplied themselves with fine wool in Spain and in France only. It is no longer so to-day. Far from remaining restricted to these two countries, these breeds, now spread over many parts of Europe, multiply themselves very considerably in Australia, and are largely introduced into America. Not only is the merino wool produced in much greater quantity than in the past, but it often acquires out of France

certain qualities which all the French woollens are far from having ; and hence results the lowering in the price of this raw material, and the necessity in which many of our manufacturers are placed of buying wherever they find the qualities the most suitable to their industry.

At the same time that the production of the merino wool increases and its value decreases, this wool is used for purposes which it had been regarded as being not well adapted when it was more scarce, and the manufacturing industry less advanced. Formerly it was only used after having been carded, and for the manufacturing of pressed and felted stuffs, that of cloth particularly; whilst, subjected to combing, it enters to-day into the making up of a great number of various stuffs, for which the taste and use is constantly increasing.

It will be understood that, placed in a new condition, the agriculturists find themselves under the necessity of studying with the most serious attention all that which concerns the merino flocks in order to manage them with the view of obtaining either wool the most suitable for carding, or that which is best adapted for combing. Two principal essential qualities must be kept in view in the study of the fleece—they are the elasticity of the wool and the strength of the fibre when one tries to break it; the elasticity, which is required when the wool is subjected to the work of carding and fulling; its degree of strength, which is of the highest importance when it is subjected to the action of combing; for then, far from breaking, nicking and felting, the staples ought to range themselves parallelly, preserving their entire length as much as possible.

Instead of being straight, the most elastic wools show a series of regularly arranged curvatures [crimps], and which makes them undulated. These undulations, or crimps, are so remarkable that it has been proposed to count them, and to regard the quality of the wool according to their number. The greatest fineness in these very elastic wools is also sought. These different qualities exist in the highest degree in the locks of little length only.

When, after having stretched a staple of this wool in such a manner as to take out all the crimps, the tension being removed, and it is left to itself again, it immediately resumes its original crimps. This operation may be repeated several times without destroying this kind of elasticity. If we continue to pull at both ends of the staple, we perceive that, having become completely straight, it stretches considerably before breaking. Finally, after breaking the fibre, the two parts of the staple resume the length and the shape they had before being distended. Such are the most striking qualities of the most elastic wools. The strongest wools have less and broader undulations; sometimes they are even quite straight; in both cases they are longer, less fine, and less elastic. The staples less numerous, less close together, make the fleece less dense; but what the fleece loses in weight by the decrease of the number of staples, it recovers again through their length and their greater diameter. It is to be remarked that the merino sheep, which yields long and resisting locks, yield, generally, even after washing, more wool than those which have locks very fine, very short, and very thick.

In adopting either of these two types of merinos, it is important that the cultivators take in consideration the pastures they can command, and the kind of dwelling for their animals; for the abundance or scarcity of food, and the usefulness which may exist in sometimes having their sheep travel to make them live more economically, during the summer upon hilly pastures, during the winter in countries lower and flatter; sometimes to have them folded upon the fields to deposit manure; sometimes, on the contrary, to have them sheltered during the whole year in folds; these various circumstances exert a greater or less influence upon these two kinds of wool.

When the sheep are very abundantly fed the fleece becomes more dense. Nothing appears at first more easy than to produce the finest wool; yet the French breeders seldom endeavor to obtain that kind of wool, because when entering into the practical details of this matter, they recognize that it loses much

of its simplicity. The quality of fine wool depends more upon the health of the animal than upon any other condition; therefore, it is necessary that the food, without being abundant, should be sufficient for the animals to be kept in good health. It is necessary thus to ascertain with care the allowance suitable to preserve health and at the same time to obtain fine wool. If, momentarily, the allowance is less than is absolutely necessary for that purpose, the wool becomes diseased—it becomes thin, tainted, and brittle. It will be shrunken in a part of its length during the line of scarcity, thickened whilst the food is more abundant; the staple ceases to have that cylindrical form so important to its quality. The diet ought, then, to produce the same effect during the whole year. These are difficulties which we should bear in mind; but this is not all.

Supposing that, from their birth, the animals be subjected to a diet not sufficiently abundant to produce the finest wool, their growth necessarily becomes slow; from the slowness in growth the sheep cannot be fattened before an advanced age, and that thus they no longer produce so much for the shambles as when, from their youth, they had been abundantly fed.

Finally, it is proper to calculate the relative depreciation of the wools more or less fine, through the effect of external agents. All the wools exposed to the alternate action of moisture and drought, as well as to the contact with foreign matters, especially with the soil, have the inconvenience of becoming hardened. This effect is observed upon the wool of medium fineness as well as upon those of great fineness; but it is so much the more marked upon the latter which the surface of the whole of the staples increases in proportion to the fineness of the fleeces. What happens in very fine and very numerously stapled fleeces? It is very evident that, though this very great bulk (*masse*) of the secreted wool, this bulk (*masse*) presents a very extended surface, composed of the surfaces of a multitude of small cylinders. If by their proximity to each other causing density, allow the water and other foreign matter to penetrate, particularly the dust with great difficulty, they also retain these bodies

longer which contribute to their deterioration. If we add that this deterioration, which takes place upon the largest surface, affects the wools which have the greatest value, (for the fine wools are worth more than the coarse ones,) we shall have the approximate estimation of the deterioration of the one and the other.

Thus are these principles laid down: 1st. The merino wool, very fine, very elastic, the most suitable for carding, can only be readily obtained upon healthy pastures, and these sufficient although not abundant, and through the means of a diet nearly as nutritious in winter as in summer. 2d. The production of a fine and dense fleece is detrimental to the production of meat. 3d. Fine wool is produced best when the conditions are proper, viz: the animals are to be sheltered the longest time possible, in folds, from the injurious action of the rain; from the drought, as well as from the soil, dust, sand, &c., which adheres to the fleeces.

If the pastures are abundant; if the sheep are sought after for the slaughter-house; if the breeders are obliged to leave their sheep in the open air, which takes place during the whole "transhumance" and during the season of folding, the attempt to produce the very fine wools will be a failure.

It is then often considered as being good economy to prefer the merinos better fed, more productive for the slaughter-house, to the merinos poorly fed, of a slow growth and of small size, which produce the finest and the dearest wools. In that case, one endeavors also to compensate the decrease in the quality of the wool by the abundance of the fleece; in order to be able to produce with profit a material of less value, one seeks to obtain it in larger quantity.

Before the long merino wools were in demand for combing purposes by manufacturers, the breeders exerted themselves to obtain heavy fleeces through the great development which they endeavored to give to the skin of the sheep. Nature produced in the merino breed, some animals which have a folded skin under the neck, around the neck, near the knee-pan and upon

their buttocks; these sheep yield more wool than if their skin had a less surface. Some breeders have preferred rams whose skin was very folded (wrinkled), and they have not been long in making these folds hereditary; but if they have been successful by this means to increase the weight of the fleeces, they have spoiled a part of these fleeces; and, moreover, they have diminished the qualities sought for in the sheep, with respect to the slaughter-house.

In fact, singular modifications are then remarked in the texture of the skin, and of the wool it secretes. The skin becomes white, dry, and very thick at the place of the folds; the wool there also becomes harsh, very stiff, and so inferior to that of the good parts of the fleece that it is of very little value.

Another criticism which the sheep with folded skins occasion, is of more importance, viz: Every time that one increases the extent of the skin, the extent of the mucous membrane of the gastro-intestinal canal is liable to be increased. This result is observed in the ox species as well as in that of the sheep. If we examine the animals which have considerable dew-lap and a folded skin, we will feel assured that, in consequence of the extent of the mucous gastro-intestine, these animals have generally a large belly. The kind of food has much influence upon the development of the belly; very nutritious food in a small compass (bulk) diminishes its space (capacity); food less nutritious, on the contrary, increases it. What I wish to say, is that with the same food the animals whose skin is very extended are inclined to have a greatly developed intestinal organ. The space occupied by the abdominal cavity injures that of the thorax; the inclination which exists upon the inferior walls of the abdomen, from the pubis to the sternum causes the digestive viscus (organs) to weigh upon the diaphragm, and renders the breathing less extended; experience proves that animals thus built remain smaller than those which have a different form, and that they cost more to fatten. It is a fact known to many breeders, and which is particularly appreciated by all the English breeders, that all the breeds destined for the slaughter-house of our

neighbors, never have their skin folded nor the belly inordinately developed at the expense of the breast.

Convinced through experience that the sheep whose skin is folded have the serious defects just described, most of the breeders no longer seek to obtain heavy fleeces through the use of rams of this lower breed; they now prefer the use of rams whose fleece possesses the desired length for the comb, and has all the density which such a long wool will admit of. These sheep may be fed abundantly without any inconvenience, because if the wool loses its fineness, it acquires as a compensation much strength of resistance; and, moreover, the food contributes to the rapid development of the animals. After these general considerations upon the wools for carding and those which are more suitable for combing, I think that the Manchamp breed can be relied upon for the improvement of the latter. But since the sheep which produce a combing wool are at the same time to be a mutton sheep, and as the Manchamp breed unfortunately at first struck the breeders as being very unfavorable for the production of food, it is indispensable that I should enter into particular details upon the origin of this breed, and upon the changes it has experienced.

They call the Manchamp breed a new type of merinos, one which produces a straight, smooth, and silky wool, similar in its form to the long English wool, but very much softer and finer.

Thanks to M. Graux, farmer on the Manchamp estate, near Berry-aubac, department of Aisne, the creation of this new type dates back as far as the year 1828. The Manchamp farm, composed of not very fertile lands, subsisted a flock of merinos, of medium size, for a long time, when in 1828 one ewe dropped a male lamb which was distinguished from all others by its wool and horns. Its straight, smooth, and silky wool was not thick; each lock, composed of staples unequal in length, ended in a point. The appearance of the horns alone, almost smooth on their surface, indicated that the wool was to be straight, or at most, very little crimped, for the hair and horns have, by their

mode of secretion, so much affinity with each other that the wool cannot be modified without the horns indicating the same modifications. This ram, which was very small, presented, in its form, defects which we at first shall see reproduce themselves, and which it became necessary to make "breed out" afterwards.

Struck with the strangeness of its fleece, foreseeing the advantage that could be derived from it, M. Graux used this ram in 1829, with the intention of using rams in the future which should have the same kind of wool. The crop of lambs of 1830 yielded one ram lamb and one ewe lamb only with silk wool; that of 1831 produced four lambs only and one ewe that had these desired qualities. Finally, it was in 1832 only that the rams with silky wool were numerous enough to serve the flock.

These rams were shown, for the first time, to the agriculturists in 1835, on the occasion of a public meeting of the agricultural committee of Roxoy (Seirne-et-Mane). I was then afforded an opportunity to study them; I ascertained that their forms were very bad for the slaughter-house. Their heads were inordinately large, necks long, breasts narrow, flanks long, and knees drawn very closely together. Whether this creation is to be considered an accidental one or not, M. Graux was endeavoring not only to preserve the silky character of the wool, but also to remove the defects in form just mentioned.

It has not been an easy matter to obtain this double result. In fact, since the rams of the new type are bred to the merino ewes at Mauchamp, this is what has been produced: The ewes preserve the qualities of the old breed, and produce a dull-appearing wool, a little longer and softer than the ordinary merino wool; the others, on the contrary, resemble the rams of the new breed; they have precisely the same wool, but, very often, their defective forms also. Each year reproduces the two kinds of lambs.

Well constituted rams have been very difficult to find, because the lambs with silky wool were not at first numerous in comparison with those that preserved the ordinary merino wool.

Little by little, it is true, the former have become more abundant; but the progression has been so slow that the yearning of 1847-'48, which produced 153 lambs, still produced 22 whose wool had the appearance of ordinary merinos. From this one may judge how long and difficult it is to establish a new type or to "fix" a variation from an old one.

We must, however, mention an important fact, namely, that breeding the rams to ewes with well characterized silky wool has, even from 1829, always produced lambs with silky wool also; so that, from the beginning of its formation, the breed has been steadily fixed in its type. Notwithstanding the many difficulties and discouragements at Mauchamp, the animals have been gradually improved in their forms; their flanks are shorter, their loins larger, and their necks shortened. The breast has become more full, particularly towards the sternum (breast bone); if sometimes it retains some narrowness, it is on the side of the withers. Finally, their heads are smaller, but without contracting the cranium. This smaller space depends upon the disappearance of the horns. The horns uselessly increase the space of the head of the adult animal, and moreover they cause in the fetus a great thickness in the bones of the cranium (skull,) that the parturition of it becomes sometimes very laborious. It was advantageous to eliminate these useless and dangerous parts; the perseverance in this direction has caused the horns to disappear in the later generations of rams.

Improved in its form, the new type reproduces nearly the forms of the old merino breed; M. Graux intends to demonstrate it by sending twenty sheep with silky wool to the Fair at Paris. Experience demonstrates that the silky type requires the same food as the old breed. Experiments have been made with animals of the two types or breeds still existing in the flock at Mauchamp, and thus it has been ascertained that, with the same treatment and the same diet, they acquire the same weight.

Before the shearing of 1848—

	Kilogrammes.
The silky yearlings weighed.....	27,500
The merino " "	25,500
The silky (ewes) 30 months.....	33,500
The merino " "	32,660
The silky sheep over 30 months, and having nourished lambs.....	32,660
The merino sheep of the same condition.....	32,005

No comparison is made of the male animals, because the ewes are kept entire and abundantly fed, whilst the others are castrated and not so well treated; in limiting the comparison to the females, one can study the two breeds sufficiently well for all practical purposes.

The silky breed does not grow very rapidly; but this is also true of the merino flocks which have heretofore been kept at Mauchamp. The middling lands, upon which rye only can be cultivated with success, present no facilities for raising stout sheep. M. Graux is, therefore, under the necessity of having them of medium size; at the same time it is proper to state that the new breed has fully maintained the average weight of the sheep kept on the estate. Unfortunately this is not the case with the weight of the fleeces.

Compared with the merino sheep of the same age, same keeping, feeding and breeding, the silky sheep do not yield so much wool. This fact can be confirmed by the yearlings, which, for the first time, produce fleeces of one year's growth; these fleeces of the silky sheep weigh less than of the merino type.

If this comparison is made with sheep which have produced and suckled lambs, the difference is still more marked, for the reason that the silky sheep lose a great quantity of wool at the time of sucking. It is, therefore, necessary that the animals whose fleece is too light, and the ewes which lose their wool too frequently, are excluded from breeding.

The present condition of this breed has given occasion to the following observations on the animals, whose fleece was washed on the sheep, as this is practiced with many animals of

Champagne and of Burgoyne; the fleeces of the silky yearlings have been fourteen per cent. inferior to the fleeces of the merino yearlings; the difference has been as high as twenty-seven per cent. in ewes.

The price of the wool, however, compensates for these differences. Up to the present time M. Graux has always sold his silky wool twenty-five per cent. higher than the merino wool; for several years the kilogramme* of the latter was sold at 6 francs,† while the kilogramme of the former was sold at 8 francs.

The value of the new wool is in consequence of its greater strength and softness. Through its greater strength, it is much more economical in combing; through its greater softness, it is particularly adapted for the manufacture of several kinds of precious stuffs.

Combing divides the wool into two parts: one part leaves the teeth of the comb and constitutes combed wool, which receives, in the manufactory, the name of "*cœur*" (heart); the other part, composed of the staples which break, remain in the teeth of the comb, and is called "*la blousee*;" this blousee can only be carded.

The proportion of *cœur* which the wool produces is of much importance, on account of the very different value of the *cœur* and of the blousee; and herein lies one of the great merits of the silky wool.

The proportion of *cœur* produced by combing depends not only upon the breed, but also upon the health of the animals; upon their age, and finally upon the skill of the comber. The comparison is best made by taking as examples the lots of wool collected under similar, if not identical, circumstances, and handled by the same workmen. Such comparisons have twice been made by M. Biétry. These trials—comprised each two lots—the one of silky wool, the other of ordinary merino wool,

* The kilogramme is 2 pounds 8 ounces, 4,428 drams *avoirdupois*.—J. H. KLIPFART.

† The franc is 18½ cents.—J. H. KLIPFART.

but lengthened and rendered more resisting, for having been produced by animals produced by a silky ram and merino ewes. I will call these latter Mauchamp merino wools.

In one of these trials, the silky wools produced—

Cœur.....	62 per cent.
Blousse.....	14 “
Loss by scouring.....	24 “
Total.....	100 “

The Mauchamp-merino wool produced—

Cœur.....	56 “
Blousse.....	18 “
Loss by scouring.....	26 “
Total.....	100 “

This result, which in both cases is very excellent indeed, can only be obtained from fleeces of well-fed animals.

In a second comparison, made with more than 300 kilogrammes of cleansed wool (they have never made any comparisons with a less quantity in any of the trials mentioned), the result has been less advantageous.

The wool entirely silky produced—

Cœur.....	59 per cent.
Blousse.....	13 “
Loss by scouring.....	28 “
Total.....	100 “

The Mauchamp-merino wool produced—

Cœur.....	51 per cent.
Blousse.....	20 “
Loss by scouring.....	29 “
Total.....	100 “

Yet the result of this second comparison is not markedly different from the first trial; for in the two cases, the quantity of combed wool is always considerably more in the silky wool than in those which have not yet entirely obtained that quality

Later, we shall compare the wools of the second category with the wools of pure merino, produced from animals having no consanguinity with the rams of Mauchamp, and then we shall see what results we may with propriety expect from the use of these rams. For the present, we state one single fact only, viz., that the Mauchamp wools having the entirely smooth and silky quality, yield much combed wool, which proves how strong and resisting it is. In the spinning and in the use of these very soft wools, the quality of softness which they have on the animal, is fully preserved. We shall state in corroboration of this assertion, a comparative statement made through the care of a skillful manufacturer, M. Fortier, a shawl manufacturer of Paris. Three shawls entirely similar in their texture and pattern had been prepared for the exhibition of French industry in 1845.

The one shawl made of the down of Cashmere, the other of the silky Mauchamp wool, the third of very fine German merino wool. The three shawls submitted to the examination of the jury, were distinguishable by the difference in their softness. In this respect the Cashmere shawl was classed the first, the Mauchamp shawl the second, and the merino shawl the third. The reporters of the commission for tissues, M. M. Deneivous and Legentil, expressed themselves thus in speaking of this experiment: These three shawls of great fineness, equally well executed, have offered us a very important comparison. So far as suppleness and softness are concerned, the wool called Mauchamp surpassed that of Saxony, and compared well with the pure Cashmere. The decision is interesting for the future of this new wool. This softness which the Mauchamp wool preserves will render it very suitable to mix with the down of Cashmere. The Mauchamp wool, says M. Bietry, is of great value to the manufacturers of Cashmere, inasmuch as it can be readily made to enter into the manufacture of Cashmere warps in giving them more strength, and without in anywise impairing the brilliancy and softness. This quality is so much the more important to us because until now the pure Cashmere tissues always had a great defect from not having sufficient body. Thanks to

the mixture of the Mauchamp wool with the Cashmere in the warps, the tissue acquires the necessary density and body for its use in dresses.

The particular or special qualities which the silky Mauchamp wool retains in the combing and in the manufacture, explain the value which the manufacturers attach to it when they properly understand its use; these qualities compensate the decrease in weight of fleece, but there are many reasons for hoping that the weight of the fleece may be increased by a judicious selection of rams and ewes.

With time and patience no doubt fleeces will be obtained as heavy as those of the merino; the locks composed of staples of equal length, and finally locks quite straight or having a few large undulations only. Then we shall have for the comb, fleeces bringing a better price than those which have heretofore been used for this purpose.

With the exception of the diminutive weight of the fleeces, we no longer find any other than very slight imperfections in the Mauchamp breed.

Some manufacturers who consider the nature of the wool staple, only admit that it is not a pure merino, but that it is produced by a cross of English rams upon merino ewes. This is an error which may do very serious mischief if propagated. In fact the half-breeds do not reproduce their qualities with near the certainty that the pure breeds do, and, on the other hand, the English half-breeds are better adapted to the agricultural localities and other circumstances, in which the merino ought not to be placed.

The fact that a merino ewe dropped a lamb bearing a wool somewhat English in appearance is not unique—simply an isolated instance—very far from it. This occurrence, noticed at Mauchamp, has also been noticed in a flock belonging to M. Bourgois, a former manager of the national sheep-breeding establishment at Rambouillet. Quite recently I received proof that such an occurrence had taken place in a flock of merinos in the neighborhood of Villeneuve-l'Archeveque department of

the Yonne. There was no mixture of English blood with the merino, neither in the flocks of M. Graux and of M. Bourgois, nor in the flock at Villeneuve-l' Archeveque.

The difficulties met with at Mauchamp in the propagation of the qualities of the new breed prove also that it was not caused by any kind of cross with a different breed of sheep, but is an entirely original production. But if doubts exist, a comparative examination of the English long-wooled sheep with the merino would soon remove them.

I said, in the commencement, that the merinos were distinguished by the fineness and abundance of their fleece; the contrary is the rule in the English long-wool breeds, even in the most famed and the most extensively spread. The wool was at a very low price in England and mutton very much in demand, when the English breeders, and particularly the renowned Bakewell, developed precocious breeds which obtained so great a reputation and contributed so greatly to the agricultural wealth of England. Since then, these commercial circumstances have become more and more influential. The immense commerce of the English induces them to bring the fine wool, used in the manufacture of cloth and soft and light stuffs, from great distances, whilst the increase of the population in their countries and its agglomeration in the large manufacturing centres renders the production of meat necessary. All the English breeds have this characteristic: that the meat is its principal production, and the wool its secondary production. The shape of the sheep has been modified with great intelligence so as to attain this result. We said and repeated, that the parts of the body which give the best meat received a very great development; of this every one can be a judge. This is not, however, the most important change that has been obtained; the English breeders wished especially to produce animals capable of being fattened with the greatest economy. To effect this the adipose tissue has been developed as much as possible; and this tissue, in these breeds modified by man's intelligence, offers very remarkable peculiarities. This tissue shows itself particularly under the

cutaneous muscles, and from the first years of life, whilst in the merino breeds, the fat is secreted at a much later period, and accumulates in larger quantities in the peritoneal folds, not far from the fleshy coating enveloping the mucous membrane of the digestive organs.

Covered with a thick coating of grease (fat,) the English animals endure the lower temperature, which they could not have done without this condition of their organization; this is an important point, since, in the rural economy of England, sheep remain during the entire winter in the open air.

But this coating of fat hinders the action of the vessels and the nerves of the skin, and ends by impairing the functions of this organ: I mean the secretion of the wool and of the cutaneous perspiration.

In the first year the skin on the English sheep is supple, rosy and unctuous, the wool soft and long; but, according as these sheep grow old, and their fat becomes thicker, the skin and the wool change in nature; the skin becomes white and dry, the wool shorter, less alive, and more brittle. With old rams abundantly fed, it sometimes even happens that the fleece falls off in flakes. In all cases, the wool of the first shearing is so much superior to that of subsequent shearings, that it is always sold separately. When the stoutness has become excessive and the vitality of the skin decreased, the animal can only bear the effects of the heat by the decrease of the cutaneous perspiration. I have seen English breeders placed under the necessity of covering old rams recently shorn; this precaution was to protect them from the direct action of the solar rays, which would have become extremely painful, and even dangerous. The English sheep perspire with difficulty, and suffer much from the heat; one of the causes which makes them suffer is entirely physical, we may even remark that they only, in the species of the sheep, are covered with a sort of lard spread over the whole body. If, in some southern breeds, the fat is secreted in great quantity under the skin, this secretion takes place upon a part

very little extended, as the tail, for instance, in the sheep having large or fat tails.

The whole organization of the English sheep having been directed with the view of the production of meat, and not chiefly towards that of wool, this organization offering the peculiarities which have just been mentioned, it is important that no doubt should exist concerning the breed of Mauchamp; for, if it is entirely merino, it must be in condition to produce good fleeces during a long period, and the better to endure the high temperature. Not only its external forms, but also its internal structure, prove that it is free from any mixture with the English breeds.

In fact, the Mauchamp sheep never show externally the coatings of fat which, in the English breeds, are as thick as the lard of the hog; they cannot fatten before the age of three years; finally, the fat is always developed in a large quantity in the abdomen.

In order to prove the extent of these opposite qualities or characteristics, it may be proper here to mention, on the one hand, observations made on two rams three years old, killed at the Agricultural and Veterinary School of Alfort, and being, one of the Dishley breed, the other of the New Kent breed; and, on the other hand, the observations made on a Mauchamp ram five years old, killed by M. Delong-Cliquet, butcher at Berryan-Bac.

The two English rams, weighing together 110 kilogrammes, produced 50 kilogrammes of fat, which could be taken from the external part of the body without making the meat too lean for consumption, and of — kilogrammes only of suet in the abdomen; whilst the Mauchamp ram, weighing 31 kilogrammes, could not have its fat removed externally, but gave 15 kilogrammes of suet in the abdomen, so that the weight of the suet was almost equal to that of the meat.

In breeds so very different, the composition of the blood could not be quite the same. In order to be satisfied on this point I requested M. Lassigne, Professor of Chemistry at Alfort, to

make a comparative analysis of the blood of a Dishley or Leicester sheep with that of the Mauchamp. The following is the result:

	Venous blood of a Dishley sheep.	Venous blood of a M. Graux's silky sheep.
Water.....	802.3	800.4
Fibrine.....	3.8	3.6
Globules.....	125.0	134.6
Albumen and soluble salts of the serum.....	68.9	61.4
	<hr/> 1.000	<hr/> 1.000

In M. Graux's breed is remarked a decrease of the water and albumen, and an increase of the globules.

In summing up, although, through the absence of the horn and form of the wool, the Mauchamp breed resembles the English breeds, it is not believed that there is any degree of consanguinity between them; a very decided difference separates them. The composition of the blood does not appear to be exactly the same, while the forms of the globules are very dissimilar, particularly that of the first animals of the new breed; finally, the secretion of the fat does not take place, either at the same age or in the same quantity, nor in the same parts of the body. These differences cause the wool to be very little impaired by age in the Mauchamp breed, and that this breed is susceptible of bearing a degree of heat and undergoing a degree of fatigue which must be avoided with the English sheep.

We must add that the new breed belongs to the small or, at most, the medium sized merino, but so far as the size of the animals is due to the barrenness of the Mauchamp farm can be easily changed. Provided with better pastures, like those of Lahagevaux (Voeges), and those of Gevrolles (Cote d'Or), the breed in two generations attains such proportions that the sheep weigh from forty-four to forty-five kilogrammes.

The final result attained is a new breed of pure merinos, producing a very soft, very strong, slightly elastic wool, destined

exclusively for combing, but producing fleeces of a light weight only.

The question is to appreciate the usefulness of this breed. We must ascertain what profit we can derive from it, and to what purposes it may be applied in the future. M. Graux has had many difficulties to encounter. After twenty years' unremitting efforts, he has not yet succeeded in making his entire flock, consisting of six hundred animals, produce the new wool which he is seeking. Every breeder who, like M. Graux, would undertake to work out a practical problem producing such a complete change, would probably find that it was not a very lucrative enterprise. The silky breed is still too recent to have the rams, through a few crosses, transmit all their qualities to half-breeds, and to transform them into sheep with silky wool. On the other hand, the quality and the weight of the silky fleece, in which its value consists, do not at present yield an increase superior to that of a merino fleece.

We must, therefore, come to the conclusion that the production of the Mauchamp silky wool will become profitable only in the future.

By this assertion it is not intended to convey the idea that advantage may not be derived from the Mauchamp rams for the improvement of the intended merino combing wools. The proof of this assertion is found in a series of trials in an experimental sheep-fold, which the government has established first at Lahagevaux (Vosges), and afterwards transferred to Gevrolles (Cote d'Or).

Bred to merino ewes, the silky rams produce very few lambs with silky wool, and many lambs which preserve the merino wool, remarkable only for the growth of its length, its softness, and its strength or resistance. When the animals of this last class are bred together the characteristics are reproduced, whilst it is exceptionally only that a few lambs with pure silky wools are produced. If through breeding to merino rams we give to their produce a merino wool, it is neither very difficult nor does it take long to modify in a certain measure a whole

flock. At Lahagevaux, as well as at Gevrolles, they have on many animals succeeded in lengthening the wool without destroying its merino qualities. Here are the comparative observations which have been made on sheep which I shall call Mauchamp-merino, and upon sheep of the Rambouillet type. The growth of the Rambouillet merino and that of the Mauchamp merino, raised and fed in the same pastures, the same sheep-folds, do not sensibly differ, as we can see by the following weight, ascertained at Gevrolles immediately after the shearing:

	Kilogrammes.
The merino sheep of more than 30 months old weighed.....	48,018
Mauchamp merino.....	46,753
The merino sheep of 30 months.....	46,750
Mauchamp merino.....	45,069
The yearling merino.....	41,083
Mauchamp merino.....	41,643
The 5 months merino ewes.....	25,045
Mauchamp merino.....	24,500
The 5 months merino ram.....	32,857
Mauchamp merino.....	33,325

If we bear in mind the weight of the animals and the weight of their fleeces washed on the back, we obtain this result, that 100 kilogrammes of live weight have produced wool, washed on the back, from—

	Kilogrammes.
Merino sheep of more than 30 months.....	3,975
Mauchamp merino.....	4,252
From the merino sheep of 30 months.....	4,840
Mauchamp merino.....	4,894
From the yearling merino.....	5,523

1st. These tables prove how near to each other the two breeds have been brought, both with regard to the produce of meat, and that of the wool washed on their back.

2d. They prove in what proportions the fleeces decrease by the effect of age and that of gestation.

The secretion of the wool becomes somewhat less from the second to the third year; from the third to the fourth it becomes still less, but for two causes, the age and condition of gestation of the sheep, for it is only after 30 months that they commence to bear (carry). The merino and the Mauchamp merino, well fed, lose however but the ninth of the weight of the wool they produce in the second year.

3d. The table proves still that the sheep descended from the Mauchamp rams, but which have not acquired a wool entirely smooth and silky, have not the inconvenience of losing a part of their fleece at the time of suckling, as it unfortunately happens to be silky Mauchamp.

The Rambouillet-type very strongly resembles the Mauchamp-merino.

Let us see what results the wools of the one and of the other offer, when scoured and combed; it is here that the advantage of using the Mauchamp rams will be made manifest.

M. Pichat, manager of the sheep-fold of Gevrolles, and M. Plivart, comber at Brion, county of Montigny-sur-Aube, have pursued these trials, which have a bearing on the totality of the merino and Mauchamp-merino wools produced in 1847, at Gevrolles.

They sorted from the Rambouillet wools, a class not well adapted for combing, 10 per cent. designated, in the manufactory, by the name of offal (abass). In the second lot (Mauchamp-merino wools), the offal (abass) was only $7\frac{1}{2}$ per cent.

The first lot (merino) lost in scouring.....	41	6-10	per cent.
The second lot (Mauchamp-merino) lost in scouring.....	32	7-10	"
The merino lot yielded in "cœur".....	39	1-10	"
The Mauchamp-merino in ".....	50	8-10	"
The merino produced in blouasse.....	19	3-10	"
The Mauchamp-merino ".....	17		"

What shall we conclude from these facts other than that the use of a Mauchamp ram can, by one single coupling and with-

out entirely changing the nature of the fleeces, render them more productive?

The offal (abass) are less considerable when sorting. The proportion of combed wool or "cœur" wool is much greater.

In this experiment I give as an example wool which had been a little thickened by the use of the Mauchamp rams. Consequently, in the distribution of the different qualities of combed wools into first, second, third, fourth, fifth and sixth qualities, the Mauchamp-merino lot has not been so advantageous as the Rambouillet lot. Nevertheless, in estimating each of these qualities, according to a scale which would reach from 17 francs to 9 fr. 75 (these are the prices of 1847) M. Plivart and his partners—M. M. Tames, Vanfronard and Noirot, estimate that 100 kilogrammes of the Mauchamp-merino wool from the flock of Gevrolles had acquired, as compared with the merino wool of the same flock, an overvalue of $12\frac{1}{2}$ per cent.

It is extremely probable that these estimates, made by skillful and conscientious men, would be sanctioned by the manufacturers.

Let us add that M. Bietey, who is a spinner, and in daily relation with manufacturers, entertains a very favorable opinion of these Mauchamp-merino wools. M. Bietey, in 1846, wrote to me that breeding the Mauchamp rams to merino ewes produce certainly a very advantageous wool for combing, preferable to the German wool for length, nerve and quantity. As soft as the latter, they are less felting, an important advantage for the manufacture of woolen muslins (*mouslin-de-laine*). If used with caution and intelligence the Mauchamp breed can, at any time, be used for the improvement of the merino wool intended to be combed.

This is, perhaps, the proper place to mention that the amount of combed wool used in France is really enormous. A statement of the woolen industry published in the official reports of the jury of the exhibition of the produce of French industry, by M. Legentil, estimates at 300 millions the annual value of all the tissues composed, wholly or partly, of wool; and it esti-

mates at 180 millions the stuffs not printed, (non foulies,) manufactured especially in Paris, Mulhouse, Reims, Ameins, Roubaix, etc. A market would, therefore, not be wanting for a merino wool whose lock should be lengthened and whose staple made more resisting by the use of the Manchamp rams. In the present state of manufacturing and agricultural industry, two kinds of merino sheep appear to be necessary: the one must supply the wool intended for cloth; the other, that which is required for the stuffs not milled (pressed). The animals of the first category must have their locks short, very full and very elastic. If the lock loses these qualities, the fleece will lose in value. In order that these qualities might be developed to the highest degree, the choice of the breed is not sufficient; it is still necessary that the fleece, which is of a high price, should be impaired neither by folding, nor by TRANSHUMANCE, nor by an abundant food.

The folding acts in a very decided manner upon the fine wool, undulated, and because the bulk of the wool offers a surface so much the greater as the staples are more numerous and thinner.

The transhumance, which is in effect to expose for a longer time these staples to the injuries of external bodies, is still more injurious.

The effect produced by feeding is incontestable. A very abundant food is indispensable to the development in a few years of the animals, and to sell them as soon as possible for consumption, is opposed to the extreme fineness of the fleeces, a quality of the first importance in those which must be carded.

If we endeavor to appreciate the extent of these effects caused by feeding upon the longer, straighter and less fine wools used in the manufacture of stuffs not milled (fulled), we will see that the staple becomes thicker, and acquires as a compensation a strength of resistance very useful in combing.

In the production of these two species of wool, the one intended for carding, the other for combing, the French breeders

have the Germans for their principal competitors; upon the London markets they must compete with the Australian colonists, whose exports increase rapidly from year to year. It then becomes interesting to dwell upon the comparative positions of the French, German and Australian producers. In France, the sheep must compensate for food by its wool, its meat and its manure; we must add the milk also in several parts of the South.

The breeder acts wisely in not allowing too great an importance to the first of these productions, when it can only be obtained at the expense of the others. In the departments where the breeding is managed with intelligence, the breeders consent with reluctance only to deprive themselves of the benefit of the folding (penning) of their lands, for they find in this practice, besides the means of saving the expense of the carriage of the manure, the possibility of burying the manure of the sheep before that, through its fermentation, it has lost a part of its fertilizing principles.

In Australia this will be easily understood. The cultural and commercial conditions differ widely from those in France. There the lands which are not exhausted through the culture of cereals require but little manure; the meat is not sold to any considerable extent; the production of the wool is sufficient to give some value to the lands which otherwise have almost none. It will be understood how important this production becomes since it constitutes the most powerful means of colonization. One might believe that in Germany the position of the proprietors of merinos is quite the same as it is in France; but, when we examine it closely, we are not long in being convinced that, with respect to climate and certain conditions of economy, it is far from being the same, at least in the parts of Germany where they devote themselves generally to the production of fine wool.

It is seldom that the proprietors of fine flocks do not live in countries where the winters are colder and specially longer than in France. The winter following of the sheep in the sheep-folds

is there more complete, and lasts longer than in our country; thus this stabulation contributes to the quality of the wool, which is thus preserved from the injuries of external bodies. Wishing to make the long winter-keeping to which they are obliged to subject their flocks profitable, the Germans strive to avoid all the causes that may injure the wool. It is therefore exceeding rare that they have their sheep folded before shearing.

A reason other than that which is caused by the length of the winters invites the Germans to endeavor to produce fine wool of the first quality, is the very little value which the meat of the sheep obtains. The depreciation of this food it seems might be explained not only by the small number of the population of that country, but also by abundance of game which exists in Germany; and this abundance of game is accounted for in its turn by the comparatively great extent of woods and forests which still cover that country. Germany, with the exception of Austria and Prussia, having, according to Lengerke, 35 per cent. of its territory covered with forests; Austria 39 per cent.; Prussia 29 per cent., and France 12 per cent. only. There exists in these differences one of the reasons which for a long time will make the German sheep much more productive through its wool than through its meat. The fact is that the ovine species multiplies very rapidly, particularly in all the countries where the wool can acquire much softness, fineness and quality. This is noticed particularly in the north and north-east, that is to say in a great part of old Prussia, the whole of Moravia, Silesia, Bohemia, Saxony, etc., where small sheep of the breed called Electoral are very popular.

Being engaged only in improving the fleeces, and at liberty to neglect to a certain extent, the production of meat and sometimes even that of manure, the Australians, the Germans and several other nations are able to produce fine wools with much facility.

From these observations let us not conclude that it is necessary to abandon these sorts of wools in France. Their

great value must induce us to produce them whenever it is practical; but it was necessary thoroughly to understand all the circumstances which favor its production.

Neither must we admit that all our breeders should now neglect the carding wools to engage exclusively in the combing. It is even desirable that we should now study better than in the past, the flocks which produce in Germany the best carding wool. The Germans, who surpass us in this kind of industry, possess probably types more advantageous than those in France. Thus, certain flocks with fine wool of good repute in our country do not have their fleeces sufficiently thick. In selecting rams producing very thick fleeces we shall succeed in obtaining with each produce a considerable quantity of wool for carding.

But these limits (reserves) established, we must acknowledge that the use of the combing wool has been greatly developed, that a great number of breeders have an interest to produce them, and finally, that the new or Mauchamp breed can contribute to the improvement of them by increasing the length, the softness, and the strength or resistance. To establish these facts and to direct the breeders in a new path, I have depended on the opinion of practical men; I have used comparative experiments, and I have quoted figures. I do not intend that these figures are to be considered as intended to establish a rule with which to measure the degree of usefulness of M. Graux's discovery. In order that it should be so, it would be necessary to have all the animals of the Mauchamp breed of the same qualities; but this is not observed in any type, even in those which are the oldest and the most homogeneous. When, for example, the administration of agriculture sells rams at Rambouillet which, for more than sixty years, belong to a family free from any mixture with other families, it always happens that some rams are very much sought after, and sold at very high prices, and others that do not sell so well are abandoned. This proceeds from that, after having selected a breed, the experienced breeders select the ram which suits

them best, in an absolute manner as well as in a relative manner. I say in an absolute manner, because there are qualities which always suit; they are those which indicate a good constitution and a good health. I say in a relative manner, because in the selection of a ram, it is indispensable to bear in mind the nature of the sheep to which he is to be bred, and the object which is sought to be obtained.

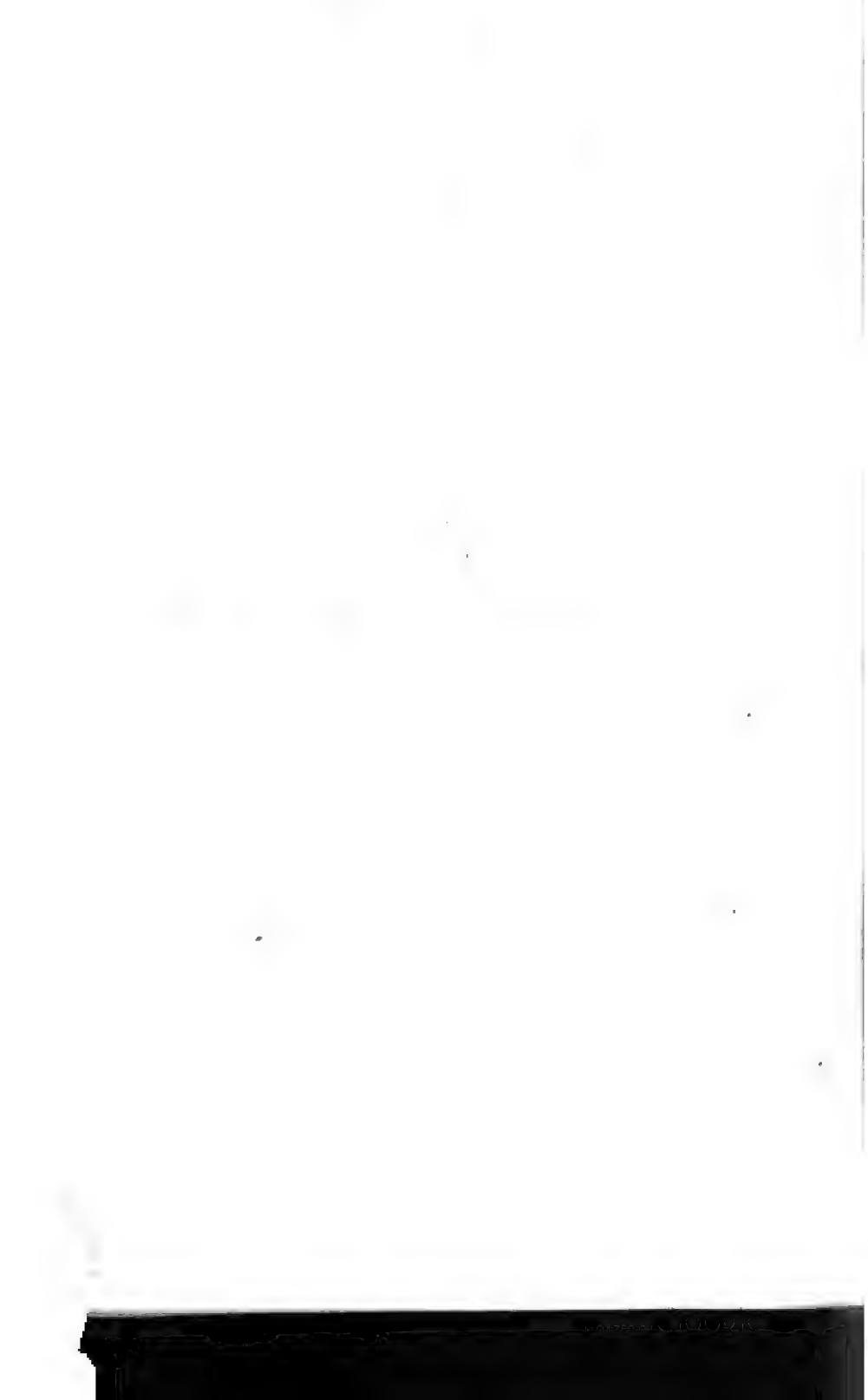
These reflections should always be presented to the minds of the breeders who select rams in the flock of Mauchamp and Gevrolles. The first of these flocks has small sized rams, whose wool is straight, smooth and silky; the second has rams of a large size, whose wool is long and soft, and presents still the nature of the merino wool. The issue of rams of Mauchamp and merino sheep, these rams of Gevrolles may be designated, as I have said, under the name of Mauchamp merinos.

The breeders who have an interest in preserving the size of their animals ought not, in my opinion, to become frightened at the weight of the Mauchamp rams. In using them only for a single cross, and by feeding the lambs abundantly, the weight of their sheep will not sensibly decrease. We may, as an instance, mention the weight of the Mauchamp and Rambouillet sheep, dropped and fed at Gevrolles.

When the sheep one possesses have a very thick fleece, there is nothing to be feared from the use of the Mauchamp rams, whose staples are not very close to each other. One essential point is, to obtain much wool; one may have seen in this notice that the Mauchamp-Rambouillet sheep gave more than the mothers which bore them.

But when the fleeces of the sheep are a little light, or when one has used rams having wool entirely silky for the first time, the preference may be given to the rams of Gevrolles; because it is important to have fleeces not too much open, and because now it is not prudent to endeavor to find a wool entirely silky. The new breed of Mauchamp, which improves every year, can, in a short time, be used for the production of those wools, of which, without any doubt, our manufacturers will derive

great advantage; it may be in using them alone, it may be in blending them with the silk and the down of the Cashmere; but we must know how to wait. Based upon the facts and the considerations presented in this memorial, my opinion is that it is right, for the present, still to limit the use of the new breed to the improvement of the merino fleeces, in which a medium fineness and length, a great strength of resistance, much softness and weight is sought.





CLASS III—HEREFORDS.

E. Phelps, Pontiac, bull Pontiac, 3 years, 1st, \$40; E. Phelps, Pontiac, bull calf Impachment, 9 months, 1st, \$10; E. Phelps, Pontiac, cow Rose, 8 years, 1st, \$10; E. Phelps, Pontiac, Lively, 1 year, 1st, \$20; E. Phelps, Pontiac, heifer calf Cora, 6 weeks, 1st, \$10.

I. H. BUTTERFIELD,
A. S. BROOKS,
J. LESSETER,
J. C. HOWARD,

Committee.

CLASS IV—AYRESHIRE.

Agricultural College, Lansing, bull Donald Dhu, 4 years, for exhibition only. S. C. Rose & Co., Coldwater, bull General, 4 years, 1st, \$40.

SANFORD HOWARD,
E. PHELPS,
C. DERBYSHIRE,

Committee.

CLASS V—ALDERNETS AND GALLOWAYS.

Agricultural College, Lansing, bull Victory, 4 years, for exhibition only. William Davey, Detroit, Polled Angus cow, 3 years, 1st, \$40.

The judges believe that Mr. Davey's cows are not the Galloway, but that they are the Polled Angus breed. They therefore recommend that Mr. Davey be awarded a gratuity equal to the first premium offered on Galloway cows.

S. HOWARD,
C. DERBYSHIRE,
E. PHELPS,

Committee.

CLASS VI—HERDS OF THOROUGHBRED CATTLE.

Calvin Pierce, Disco, herd of Devons, 1st, \$50. H. Warner, Dexter, herd, bull and four progeny, 1st, \$50; Calvin Pierce, Disco, herd, bull and four progeny, 2d, \$25.

W. R. SCHUYLER,
W. H. ARNOLD,
A. R. HOAG,

Committee.

CLASS VII—GRADE CATTLE.

J. S. Tibbits, Nankin, cow, 9 years, 1st, \$15; Wm. Smith, Detroit, cow, 4 years, 2d, \$10. H. A. Snyder, Greenfield, heifer, 3 years, 1st, \$10; Wm. Slater, Springwells, heifer, 3 years, 2d, \$6. J. S. Tibbits, Nankin, heifer, 2 years, 1st, \$7; Michael Ryan, Detroit, heifer, 3 years, 2d, \$5. H. McPherson, Livonia, heifer, 1 year, 1st, \$6; E. Phelps, Pontiac, heifer, 1 year, 2d,

24. C. L. Blanchard, Morenci, pair steers, 2 years, 1st, \$12. C. J. Sprague, Farmington, pair steers, 2 years, 2d, \$10. C. L. Blanchard, Morenci, pair steers, 1 year, committee recommend as worthy of a premium. A. C. Porter, Detroit, helper calf, 5 months, 1st, \$5. Hiram Arbor, Ann Arbor, grade steer, 5 years, commended; A. C. Porter, Detroit, bull, 4 years, commended; Homer Rector, Cady, bull, 2 years, commended; C. J. Sprague, Farmington, pair twin calves 4 months, commended.

F. FOWLER,
L. SPRAGUE,
C. M. DERBYSHIRE,
Committee.

CLASS VIII—WORKING OXEN AND STEERS.

Seven years old.

F. Fowler, Reading, 1st, \$20; J. D. Perry, Redford, 2d, \$15.

Steers.

F. Fowler, Reading, 4 years, 1st, \$15; A. C. Porter, Detroit, 2d, \$10. J. B. Arma, Dexter, 3 years, 1st, \$10; F. Fowler, Reading, 2d, \$7. J. D. Perry, Redford, trained oxen, 7 years, 1st, \$10. A. C. Porter, per Jedekiah Benedict, trained 4 year old steers, \$5. C. J. Sprague, 1 year old, \$5.

W. R. SCHUYLER,
A. R. HOAG,
J. E. ALLEN,
WM. CANFIELD,
Committee.

CLASS IX—FAT CATTLE.

W. D. Page, Morenci, for fat steers, 5 years, 1st, \$20; J. & P. Rauss, Detroit, for fat oxen, 5 years, 2d, \$10. William Smith, Detroit, fat cow, 4 years, 1st, \$10; William Smith, Detroit, 2d, \$7.

WM. WHITFIELD,
WM. RALLENBURY,
JAMES SATTERLEE,
Committee.

DIVISION B—HORSES.

CLASS I—THOROUGHBREDS.

Elliot Grey, Tecumseh, stallion Morris, 4 years, 1st, \$50; H. Chappell, Detroit, stallion, Rook Mirandi, 2d, \$25. H. Chappell, Detroit, stallion, Chas. E. Stuart, 3 years, 1st, \$20; Landon & Alvord, Camden, stallion, Rhoderick Dhu, 2d, \$10. E. N. Willcox, Detroit, stallion, Maitland, 2 years, 1st, \$12. E. N. Willcox, Detroit, stallion, Golden Plover, 1 year, 1st, \$10. E. N. Willcox, Detroit, stallion foal, Gladstone, 1st, \$6. E. N. Willcox, Detroit, brood mare, Magdalena, with colt by side, 5 years or over, 1st, \$20. K. C. Barker, Detroit, brood mare, with colt by side, 4 years, 1st, \$15. E. N. Willcox, Detroit, brood mare, Madestone, without colt, 4 years, 1st, \$12; H. Chappell, Detroit, brood mare, Fanny Howard,

without colt, 4 years, 2d, \$8. H. Chappell, Detroit, mare Annette, 3 years, 1st, \$12; E. N. Wilcox, Detroit, mare Mira, 2d, \$8. E. N. Wilcox, Detroit, mare Huddleston, 2 years, 1st, \$10.

M. E. CROFOOT,
GENERAL CUSTER,
WM. C. DUNCAN,
A. J. DEAN,

Committee

CLASS XI—HORSES PART THOROUGHBRED.

Calvin A. Green, Pontiac, stallion, 4 years, Magna of Avon, 1st, \$50; H. E. Cady, Mead's Mills, stallion, Eagle Eye, 2d, \$25. Robert S. Campbell, Utica, stallion, 3 years, Gen. Sherman, 1st, \$15—conditional that he files pedigree. Y. E. Benton, Linden, stallion, 2 years old, Plover, 1st, \$12. Richard Lewis, Brady, brood mare, 5 years, colt by side, 1st, \$20; E. N. Wilcox, Detroit, brood mare, 5 years and over, Winnona, 2d, \$12. A. D. Power, Farmington, mare, 4 years, without colt, Dolly, 1st, \$12. H. A. Flint, Ann Arbor, mare, 3 years, 1st, \$12; H. A. Flint, Ann Arbor, mare, 2d, \$8. Richard Lewis, Brady, mare, 2 years, Yellow Rose, 1st, \$10; H. A. Flint, Ann Arbor, mare 2d, \$8. K. C. Barker, Detroit, mare, 1 year, 1st, \$7. Richard Lewis, Brady, filly foal, 1st, \$5; Calvin A. Green, Pontiac, filly foal, 2d, \$4. J. T. Bateman, Walled Lake, gelding, 4 years, Dea. Smith, 1st, \$12; A. D. Power, Farmington, gelding, 4 years, 2d, \$8. Y. E. Benton, Linden, gelding, three years, Prince, 1st, \$10; C. M. Sly, Plymouth, gelding, Billy, 2d, \$6.

M. E. CROFOOT,
GENERAL CUSTER,
WM. C. DUNCAN,
A. J. DEAN,

Committee

CLASS XII—HORSES OF ALL WORK.

W. H. Drew, Birmingham, stallion, 4 years old and over, Coachman, 1st, \$50; Col. J. H. Wood, Adrian, stallion, M. Paymaster, 2d, \$25. J. B. Coonley, Farmington, stallion, 3 years and over, Bashaw, Jr., 1st, \$15; A. Swinerton, Dundee, stallion, Brick Pomeroy, 2d, \$10. Orson Ingalls, Almont, stallion, 2 years, Fox, 1st, \$12; H. A. Snyder, Greenfield, stallion, 2d, \$8. Homer Rector, Cady, stallion foal, 1st, \$6; H. Sprague, Big Beaver, stallion foal, 2d, \$4. H. A. Flint, Ann Arbor, gelding colt, 4 years, 1st, \$12; C. A. Green, Pontiac, gelding colt, Dick, 2d, \$8. Orson Ingalls, Almont, brood mare, 5 years and over, with colt by side, 1st, \$20; J. S. Tibbits, Nankin, brood mare, 2d, \$12. J. S. Tibbits, Nankin, filly, 2 years, Nellie, 1st, \$10; J. D. Perry, Bedford, filly, Mary, 2d, \$8. Orson Ingalls, Almont, filly foal, 1st, \$4.

C. T. LOCKWOOD,
ELLIOTT GRAY,
CHAS. MONROE,
J. H. CANNIFF,

Committee

CLASS XII—ROADSTERS AND TROTTING STOCK.

A. C. Fisk, Coldwater, stallion Mambrino Chief, 5 years and over, with 5 colts, 1st, \$100; A. Wales, Fraser, stallion Bob Hunter, with 5 colts, 2d, \$50. J. D. Franklin, Jackson, stallion, Grey Eagle, 4 years and over, 1st, \$50; K. C. Barker, Detroit, stallion Grey Eric, 2d, \$25. J. J. Oakley, Detroit, gelding, 8 years, Mike Hays, 1st, \$10; A. C. Fisk, Coldwater, gelding, 2 years, Dexter, Jr., 1st, \$10; William Lockwood, Detroit, stallion, 2 years, Billy Lockwood, 2d, \$8. A. C. Fisk, Coldwater, stallion, 1 year, 1st, \$10; A. C. Fisk, Coldwater, stallion, 2d, \$6. A. Wales, Fraser, stallion foal, 1st, \$6. Mrs. A. E. Russell, Detroit, brood mare, 5 years and over, colt by side, 1st, \$25. Charles Smock, Detroit, brood mare, 7 years, without colt, 1st, \$20; James Barnes, Pontiac, brood mare, 2d, \$10; C. M. Sly, Plymouth, mare, 4 years, without colt, 2d, \$8. K. C. Barker, Detroit, mare, 3 years, Belle, 1st, \$10; W. T. Campbell, Mount Clemens, mare, Belle Mahone, 2d, \$6. A. C. Fisk, Coldwater, mare, 2 years, Fanny Johnson, 1st, \$6; A. C. Fisk, Coldwater, mare, 1 year, Kitty, 1st, \$7. Col. J. H. Wood, Adrian, pair driving horses, Jack and mate, 1st, \$50; Wm. A. Owen, Detroit, pair driving horses, Kitty and mate, 2d, \$30; Lewis Barnes, Pontiac, pair driving horses, 3d, \$20. W. B. Darling, Detroit, single trotting horse, Ristori, 1st, \$30; J. Welch, Canandaigua, single trotting horse, Lady Jackson, 2d, \$20; John Starkweather, Ypsilanti, single trotting horse, Maximilian, 3d, \$10.

A. J. DEAN,
C. T. GORHAM,
C. J. HAYES,
G. A. CARTER,
E. VAN VALKENBURGH,
Committee.

CLASS XIV—DRAUGHT HORSES.

C. J. Buckland, Guelph, Canada, stallion, 4 years and over, Sampson, 1st, \$30. F. B. Sibley, Detroit, stallion, 3 years and over, Punch, 1st, \$10; F. B. Sibley, Detroit, stallion, Chub, 2d, \$8. A. Fisher, Oak, pair draught horses, 1st, \$15.

HARVEY HAINES,
C. E. MICKLEY,
JAMES N. BENNETT,
R. PURSELL,
Committee.

CLASS XV—CARRIAGE AND BUGGY HORSES.

C. L. Blanchard, Morenci, matched carriage horses, 16 hands and over, 1st, \$60; John Starkweather, Ypsilanti, matched carriage horses, 16 hands and over, 2d, \$25. Jas. C. DeYoe, Jackson, matched carriage horses, under 16 hands, 1st, \$40; J. H. Morris, Pontiac, matched carriage horses, under 16 hands, 2d, \$20. Wm. C. Duncan, Detroit, matched carriage horses, 3 years old, 1st, \$15. John Strong, Detroit, single carriage horse, 1st, \$8. J. H. Boden, Romeo, single carriage horse, 3 years, 1st, \$6; George Green, Farmington, single carriage horse, 2d, \$5.

A. J. DEAN,
C. T. GORHAM,
M. E. CROFOOT,
Committee.

CLASS XVI—SADDLE HORSES.

S. H. Smithers, Detroit, gent's saddle horse, 1st, \$15; Elliott Gray, Tecumseh, gent's saddle horse, 2d, \$19.

JOHN STARKWEATHER,
A. S. BERRY,
J. C. DEYOE,

Committee.

CLASS XVII—MATCHED HORSES.

H. B. Chapman, Reading, pair matched horses, 1,200 lbs. and over, 1st, \$30. R. Lee, Farmington, pair matched horses, under 1,200 lbs., 1st, \$20; A. B. Donnelson, Pontiac, pair matched horses, under 1,200 lbs., 2d, \$10.

WM. C. DUNCAN,
P. L. SWORD,
J. C. DEYOE,

Committee.

CLASS XVIII—JACKS AND MULES.

George Gibson, Wayne, Spanish jack, 7 years, 1st, \$30; A. B. Baker, Somerset, 2d, \$15. Henry Lyon, Adams, pair of aged mules, 1st, \$10; Henry Lyon, Adams, pair of aged mules, 2d, \$5. Henry Lyon, Adams, Jenny, 1st, \$8. Henry Lyon, Adams, show of young mules, 1st, \$20.

S. B. WAKEFIELD,
A. S. BERRY,
W. P. CLARK,

Committee.

TRIALS OF SPEED.

Three Minute Horses—Mile Heats. Best 2 in 3.

Alonzo Rolfe, Detroit, Lady Rolfe, 2:50, 2:48½, 1st, \$75; George J. Fuller, Adrian, Jack Sheppard, 2:50¼, 2d, \$25.

Stallions—Mile heats, 2 in 3.

J. D. Franklin, Jackson, Grey Eagle, 1st, \$100, 2:36, 2:36¼; A. C. Plisk, Coldwater, Belmont, 2d, \$25.

Stallion, Mare or Gelding—Mile Heats, 3 in 5.

H. S. Compton, Rock, Island, Ill., Kirkwood, 1st, \$250; Simon Anderson, Ypsilanti, Victor Hugo, 2d, \$50; time, 2:32¼, 2:33¼, 2:36¼.

Buggy Horses—Two Mile Dash.

J. B. Baugh, Detroit, sorrel gelding, 1st, \$75; time, 6:04. Protested by T. J. Bryan, on the ground that his horse won the race, but was ruled out as a pacer. The Executive Committee sustained the protest at its meeting, but at the annual meeting, reconsidered the subject, and the award was made to Mr. Baugh. A. S. Berry, Adrian, Billy Weaver, 2d, \$25.

Three Year Olds—Mile Heats.

William Foster, Detroit, Sea Gull, 1:53, 1st, \$100; Landon & Alvord, Camden, Rhoderick Dhu, 2d, \$25; time, 1:53, 1:53.

Thoroughbreds, all Ages—Two Mile Heats.

A. Van Slyke, Corunna, Highly, 1st, \$200; A. L. Chappell, Detroit, Rabbithash, 2d, \$25; time, 3:43½, 3:46½, 3:48; 3:58.

DIVISION C—SHEEP, SWINE AND POULTRY.

CLASS XIX—SPANISH MERINOS.

J. & G. Wood, Lodi, buck, 2 years, 1st, \$20; J. & G. Wood, Lodi, 2d, \$10. J. & G. Wood, Lodi, buck, 1 year, 1st, \$16; J. & G. Wood, Lodi, 2d, \$8. J. & G. Wood, Lodi, 5 buck lambs, 1st, \$16; J. & G. Wood, Lodi, 5 ewes, 2 years, 1st, \$16; J. & G. Wood, Lodi, 5 ewes, 1 year, 1st, \$12; J. & G. Wood, Lodi, 5 ewe lambs, 1st, \$10.

The committee on Spanish Merino Sheep report that there was but two entries of three-year old bucks, neither of which was thought worthy of the premium offered. Of the ewes entered, all belonged to Mr. Wood, of which the three-year olds were excluded, they not having bred lambs the present season. On the two-year old bucks, the committee award the first premium to one owned by Mr. J. Wood, of Lodi, and known as the Stowell buck, and the second premium to that of the same flock, known as the Hammond buck.

B. G. BUELL,
WM. A. DRYER,
EDWIN PHELPS,
Committee.

CLASS XX—MICHIGAN FINE-WOOLS.

L. J. Thompson, North Adams, buck, 3 years, 1st, \$15; L. J. Thompson, North Adams, 2d, \$8. L. J. Thompson, North Adams, buck, 2 years, 1st, \$10; L. J. Thompson, North Adams, 2d, \$6. J. & G. Wood, Lodi, buck, 1 year, 1st, \$8; L. J. Thompson, North Adams, 2d, \$4. L. J. Thompson, North Adams, 5 ewes, 2 years, 1st, \$8. J. & G. Wood, Lodi, 5 ewes, 1 year, 1st, \$8; L. J. Thompson, North Adams, 2d, \$4. L. J. Thompson, North Adams, 5 ewe lambs, 1st, \$6.

A. D. POWER,
H. B. HURD,
H. HUFF,
Committee.

CLASS XXI—SOUTHDOWN AND OTHER MIDDLE WOOLED SHEEP.

Samuel Toms, Oshawa, Canada, buck, 3 years, 1st, \$15; S. T. Douglas, Groesse Isle, 2d, \$8. Samuel Toms, Oshawa, Canada, buck, 2 years, 1st, \$10; Wm. Newton, Pontiac, 2d, \$5. Samuel Toms, Oshawa, Canada, buck, 1 year, 1st, \$8; Henry W. Lord, Pontiac, 2d, \$4. Daniel Whitfield, Pontiac, 5 buck lambs, 1st, \$8. Daniel Whitfield, Pontiac, 5 ewes, 3 years, 1st, \$10; William Newton, Pontiac, 2d, \$6. Daniel Whitfield, Pontiac, 5 ewes, 2 years, 1st, \$8; Samuel

Toms, Oshawa, Canada, 2d, \$4. Henry W. Lord, Pontiac, 5 ewes, 1 year, 1st, \$3; William Newton, Pontiac, 1 year, 2d, \$4. Daniel Whitfield, Pontiac, 5 ewe lambs, 1st, \$6.

A. M. FITCH,

A. W. SIGUR,

Committee.

CLASS XXII—LEICESTER, COTSWOLD AND OTHER LONG-WOOLLED SHEEP.

Samuel Toms, Oshawa, Canada, buck, 3 years, 1st, \$15; George Peel, Chatham, Canada, 2d, \$8. Samuel Toms, Oshawa, Canada, buck, 2 years, 1st, \$10; John Cawkes, Romeo, 2d, \$5. Wm. Lovering, Woodstock, Canada, buck, 1 year, 1st, \$8; James Fisher, Hyde Park, Canada, 2d, \$4. L. Lapierre, Paris, Canada, 5 buck lambs, 1st, \$8; William Hendrie, Hamilton, Canada, 2d, \$4. William Hendrie, Hamilton, Canada, 5 ewes, 3 years, 1st, \$10; William Lovering, Woodstock, Canada, 2d, \$5. William Lovering, Woodstock, Canada, 5 ewes, 2 years, 1st, \$8; William Hendrie, Hamilton, Canada, 2d, \$4. L. Lapierre, Paris, Canada, 5 ewes, 1 year, 1st, \$8. Samuel Toms, Oshawa, Canada, 2 ewes, 1 year, 1st, \$4. William Hendrie, Hamilton, Canada, 5 ewe lambs, 1st, \$6; L. Lapierre, Paris, Canada, 2d, \$3.

The committee would respectfully report that the competition in this class was large, and in some instances so close that it was difficult to make a decision. There was a large number of worthy animals besides those receiving premiums.

MARK HAGLE,

ORSON INGALLS,

JAMES TOBY,

Committee.

CLASS XXIII—FAT SHEEP.

Samuel Toms, Oshawa, Canada, pen of 5 fat sheep, 1st, \$10; William Lovering, Woodstock, Canada, 2d, \$3.

SANFORD HOWARD,

THOMAS DAWSON,

JURIAN WINNE,

Committee.

CLASS XXIV—SWINE.

Samuel Toms, Oshawa, Canada, 1 boar, small foreign breed, 1st, \$20; H. D. Court, Battle Creek, boar any breed, 1st, \$10; H. D. Court, Battle Creek, Chester White boar, 1st, \$5; H. D. Court, Chester White boar, 2d, \$3; H. D. Court, Battle Creek, pen Chester pigs, 1st, \$5; H. D. Court, Battle Creek, dis., \$3; J. S. Tibbits, Nankin, 1 Essex boar, 2 years, 1st, \$5; J. S. Tibbits, Nankin, 1 Essex sow, 2 years, 1st, \$5; William Smith, Detroit, 1 Suffolk boar, 2 years, 1st, \$5; William Smith, Detroit, 1 Suffolk sow, 2 years, 1st, \$5; Samuel Toms, Oshawa, Canada, 1 Berkshire sow, 14 months, 1st, \$5; Bernard Ste Grey, Grosse Point, 1 fat pig, Essex, 11 months, \$3; Bernard Ste Grey, Grosse Point, 2 weeding pigs, Essex, 5 months, \$3; J. S. Tibbits, Nankin, 1 Yorkshire boar, 2 years, \$5; J. S. Tibbits, Nankin, lot Yorkshire pigs, 3 months, dis., \$3; John Cawker, Romeo, best lot of Essex pigs, 1st, \$5.

C. C. STOWE,

CHAS. E. BISSEY,

WM. ALLEN,

JOSHUA SIMMONS,

Committee.

CLASS XXV—POULTRY.

Mrs. A. Brink, Perrinsville, 1 pair pea fowls, 1st, \$2; Mrs. Frances Leslie, Dearborn, 3 domestic turkeys, 1st, \$2; Mrs. Frances Leslie, Dearborn, pair common geese, 1st, \$2; Benoit Ste Grey, Grosse Point, coop gray Dorkings, 1st, \$2; Thomas Blackett, Roseville, coop Spanish fowls, 1st, \$2; Benoit Ste Grey, Grosse Point, coop white Surrey Dorkings, 1st, \$2; Mrs. A. Brink, Perrinsville, coop gray Brahmas, \$2; Eddie Austin, Detroit, 2 silver Poland chickens, \$2; Thomas Blackett, Roseville, 1 pair common ducks, 1st, \$2; George Wilcox, Detroit, 1 pair Aylesbury ducks, 1st, \$2; Herman Tenwinkel, Detroit, 1 coop pigeons, greatest variety of breeds, 1st, \$3. Edward Moreton, Detroit, 1 goat, \$3.

D. CLARKSON,
LYMAN MASON,
O. F. CRANE,
Committee.

DIVISION D—FARM IMPLEMENTS.

CLASS XXVI.

J. F. Bryan & Bro., Detroit, plow for turning under stubble, draught 212 lbs., 1st, \$5; J. F. Bryan & Bro., Detroit, plow for general use, made in any other State, 1st, \$5 and dip; F. C. Goff, Cleveland, greensward plow, draught 287 lbs., \$10 and dip; F. C. Goff, Cleveland, sub-soil plow, 1st, \$5 and dip; F. C. Goff, Cleveland, one steel plow, dip; O. C. Gale & Co., Albion, plow for general use, made in Michigan, \$5 and dip; F. M. Mattice, Detroit, drain or ditching plow, \$5 and dip; A. Chaney, Detroit, best plowing with horses, \$10 and silver medal; M. H. Chase, Royal Oak, plowing with horses, 2d, \$6 and silver medal; Fairbanks & Co., New York, one dynamometer, medal.

E. W. RISING,
WILLIAM TAFT,
DAVID G. BROWN,
Committee.

CLASS XXVII.

Fords & Howe, Oneonta, N. Y., 1 two-horse wheel cultivator, or horse-hoe, 2d, dip. Fords & Howe, Oneonta, N. Y., 1 one-horse thill cultivator, 1st, \$8. A. Chaney, Detroit Agricultural Works, Detroit, 1 wooden harrow, 1st, \$3. A. Chaney, Detroit Agricultural Works, Detroit, 1 implement adapted to do the work of the harrow, 2d, dip. A. Chaney, Detroit Agricultural Works, Detroit, 1 wheel cultivator for fallows, 1st, silver medal; A. Chaney, Detroit Agricultural Works, Detroit, 1 horse-hoe, for one horse, with thills, 2d, dip. Van Riper & Trowbridge, Dearborn, 1 harrow for general use, 1st, \$5 and dip. Van Riper & Trowbridge, Dearborn, 1 iron harrow, 1st, \$3; Thomas Thorley, Southfield Center, 1 one-horse excelsior reversible cultivator, 2d, \$3. O. Charles Gale & Co., Albion, 1 machine adapted to the work of a harrow, 1st, \$5 and dip. O. Charles Gale & Co., Albion, 1 one-horse cultivator, 1st, \$3; A. L. Dresser, Lowell, 1 wheel-cultivator, 2d, dip. rec. Ira Ladd, Adrian, two-horse cultivator, 1st, silver medal. A. Chaney, Detroit Agricultural Works, Detroit, scarifier and pulverizer, 1st, dip.

JAMES H. HEMINGWAY,
JOHN C. EMERY,
EBER DENISON,
BENJAMIN SACKETT,
Committee.

CLASS XXVIII.

J. F. Bryan & Bro., Detroit, two-horse seed drill for grain, silver medal; Peter Low, Adrian, broad-cast seeder cultivator and roller, silver medal; Thomas & Mast, Springfield, Ohio, grass and clover seed sower, \$2 and dip; Thomas & Mast, Springfield, O., grain drill and grass-seed sower, combined, \$2 and dip; Charles Sutherland, Romeo, hand corn planter, dip; P. D. Beckwith, Dowagiac, seed-sower and roller combined, dip.

J. D. ADAMS,

D. J. BRIGGS,

H. COOK,

Committee.

CLASS XXIX.

J. F. Bryan & Bro., Detroit, 1 hay feeder, dip; Abner D. Manly, Washington, 1 hoisting and transferring pulley, with apparatus, etc., dip; J. H. Gordon, Rochester, N. Y., self-raking and binding harvester, silver medal; J. F. Bryan & Bro., Detroit, 1 rafter hook, dip; F. W. Tucker, Lowell, variety of rakes and cradles, dip; J. B. Gordon & Co., Rochester, N. Y., self-raking and binding harvester, dip. on binder; J. M. Wanzer & Co., Chicago, 1 sulky horse-rake, 1st, \$3; E. B. Dewey, Pontiac, 1 horse hay-fork, 2d, dip; J. P. Coonley, Farmington, 1 patent horse pitchfork, 1st, silver medal.

The committee on haying and harvesting implements beg leave to report that there was a fine display of mowers, reapers, and harvesters, but the several exhibitors only placed their machines on exhibition with the understanding that there should be no competition, as any reward that might be made, would necessarily have to be made without any test or trial. The committee also report that they found on exhibition a full assortment of almost every variety of tools and machines adapted to harvesting work, many of which were comparatively new inventions or great improvements on old. That the committee did not have in many of them, a sufficient test to enable them to do justice to themselves in making their awards. They noticed on exhibition a self-binding attachment, that seemed to do its work well and with expedition, and seems to deserve a special notice and premium; also, a hoisting and transferring pulley, etc. Your committee gave as good a trial to the potato-digger as was possible, and while we see improvements that would warrant success in the future, we deem them not sufficiently perfected to warrant us in making any awards of premiums.

H. O. HANFORD,

WM. SEARS,

JOHN PRINDLE,

Committee.

CLASS XXX.

J. F. Bryan & Bro., Detroit, threshing machine combined with power and separator, 1st, dip. and medal; J. F. Bryan & Bro., Detroit, 1 root cutter, 1st, \$3 and dip; E. F. Baranum, Detroit, American family cider and wine mill, 1st, dip; C. E. Hutchinson, Cleveland, O., straw and stalk cutter, hand power, 1st, \$3 and dip; G. E. Hutchinson, Cleveland O., straw, hay and stalk cutter, horse power, 1st, medal; W. A. Pettingill, Inkster, combined clover seed thrasher and separator, 1st, medal; F. J. Tanner & Co., Detroit, union portable grist and feed mill, 1st, silver medal; Thos. H. Whelpley, Monroe, cane crushing mill, medal.

L. WOODWARD,

T. DENSMORE,

O. R. PETTINGILL,

Committee.

CLASS XXXI.

Caspar Dreher, Detroit, 1 open buggy, 1st, \$10; J. F. Bryan & Bro., Detroit, 1 pair bobsleds for lumbering, 1st, dip; John Patton, Detroit, 1 two-horse family carriage, 1st, \$10 and silver medal; John Patton, Detroit, greatest variety of carriages and buggies, 1st, \$25 and dip; Joram Priest, Detroit, 1 family carriage, 2d, dip; Joram Priest, Detroit, 1 jump-seat rockaway, 2d, dip; Joram Priest, Detroit, 3 top buggies, 1st, \$10; Joram Priest, Detroit, 3 open buggies, 2d, dip; Joram Priest, Detroit, 1 family sleigh, 1st, \$10; Joram Priest, Detroit, 2 dump carts, 1st, \$5; Joram Priest, Detroit, 1 spring market wagon, 1st, \$10; Hopkins & Bro., Detroit, 1 baker's wagon, 1st, dip; Frederick Reichle, Detroit, one-horse family carriage, 1st, \$10; Frederick Reichle, Detroit, 1 phaeton, 1st, \$10; Frederick Reichle, Detroit, 1 trotting wagon, 1st, \$10; Joram Priest, Detroit, 1 phaeton, 2d, dip; M. R. Sutton, Romeo, wagon lifting-jack, dip; John Patton, Detroit, one-horse family carriage, 2d, dip; Hale & Flagley, Grass Lake, equalizing bars for carriages of all kinds, dip; Brockway & Leaverens, Galesburg, wagon skien and carriage axles, dip; A. S. Berry, Adrian, single light trotting buggy, dip.

JOSEPH MOSES,
SAMUEL HALEY,
WM. H. RUSSELL,

Committee.

CLASS XXXII.

Spicer, Crossman & Co., Marshall, best pump and power combined, 1st, medal; Spicer, Crossman & Co., Marshall, Cranton's 8-horse equalizer, 1st, dip; R. S. Hall, Hamburg, best fruit gatherer, 1st, dip; Dr. L. C. Rose, Detroit, best half-dosen hoe, \$1 and dip; J. G. & T. Munger, Harrow, Colchester, C. W., friction roller farm-gate, 1st, dip; Cronk, Boynton & Co., Auburn, N. Y., patent attachment for applying to ordinary grindstones, 1st, dip; J. F. Bryan & Bro., Detroit, farmers' grinder, 1st, dip; J. F. Bryan & Bro., Detroit, iron screw fruit press, 1st, dip; Jones & Grannis, Adrian, harvest knife sharpener, 1st, dip; N. B. Rowley & Son, Detroit, best hay scales, 1st, \$5 and dip; N. B. Rowley & Son, Detroit, 5 portable scales, (1st premium), 8 grocers' scales, 500 lb. coal balancer—beautiful assortment, worthy of notice. Fairbanks, Greenleaf & Co., Chicago, Ill., \$1 and dip; N. Pierce, Chelsea, stump and grub puller, "Little Giant," silver medal; Mechanics' and Inventors', Detroit, bag-holder, 1st, dip; Abraham Maybee, Monroe, best road scraper, 1st, \$1; H. M. Smith, Kalamazoo, 8 patent hay knives, 1st, dip; E. F. Benedict, Niles, 1 animal poke, 1st, dip; W. H. Smith, Kalamazoo, patent bag-holder, dip; J. D. Mathers, Springport, portable hand-sawing machine, dip; W. C. Tuttle, Geneva, N. Y., cross-cut saw, dip; Wm. Westaway, Detroit, combined stump and grub puller, dip; Sydney Hudson, Milford, 1 fruit ladder, 1st, dip; J. W. Amphlett, Detroit, 1 lot wash-boards, dip.

F. McLAREN,
F. M. BRIGGS,

Committee.

A claim being made that the scales had been passed without due examination, after receiving the above report, a special committee on scales was appointed, consisting of E. S. Sill, of Monroe, and Austin Wales, of Erin, who made the following report:

Mr. Austin Wales, Erin, Macomb county, and Mr. E. S. Sill, Monroe county, a committee to examine Fairbanks' Scales, 1st premium, exhibited by Fairbanks, Greenleaf & Co., Chicago, Ill., report: This scale is of superior character, and is much improved from the old scale. This scale has a rack attached, which adds much to the convenience in weighing cattle or hogs, all of first quality of material; can be handled by one man with perfect ease. Weighs

from 2 lb. to 4 tons. We tried the scale, and found it a correct weighing scale. We consider this scale of a superior quality, and justly entitled to a first premium.

Hay scales made at Buffalo Scale Works, weighs from 1 lb. to 4 tons, 2d premium: N. B. Rowley & Son. We examined this scale and found it fully equal in all parts except the rack, which is a great convenience. The bar or bars of this seems to be of a better character than the Fairbanks Scale, and we find it difficult to decide which is really the best; but for convenience of all things we conclude to give the Fairbanks Scales the preference.

The two reports being referred to the business committee, the following resolution was adopted.

Resolved, That we recognize the report of Viewing Committee No. 29, regularly appointed to examine articles in Class 32, Division D, in which there is awarded the first premium, 1st, Hay and Cattle Scales, manufactured by the Buffalo Scale Works Company, N. B. Rowley & Son, agent, Detroit; and 2d premium to Fairbanks Scales, of Fairbanks, Greenleaf & CO., Chicago, to be correct. The committee did examine both scales, and in our judgment were perfectly competent to judge of their merits; and we believe no special committee would have been appointed but for the misrepresentations of the agent of Fairbanks, Greenleaf & Co.

W. J. STERLING, *CA's*.

W. S. WILLCOX,

WM. ADAIR.

CLASS XXXIII.

C. D. Strubel, Detroit, 6 milk pans, 1st, \$1; C. D. Strubel, Detroit, clothes-wringing machine, 1st, dip; C. D. Strubel, Detroit, 1 coffee burner, 1st, dip; C. D. Strubel, Detroit, 1 corn popper, 1st, dip; C. D. Strubel, Detroit, 1 egg beater, 1st, dip; Henry P. Crouse, Hartland, 1 clothes-dryer for hotel, 1st, dip; W. D. Whalen, Northville, 1 water beater, 1st, dip; Shepley & Irwin, White House, 1 herculean clothes-washer and boiler, 1st, dip; David N. Greene, Coldwater, improved grocer's hand-scoop, 1st, dip; Wm. Davis & Sons, Detroit, 1 refrigerator, 1st, dip; A. C. Vesey, Andover, N. Y., 1 hand loom, 1st, \$5; S. B. Rowley, Philadelphia, Pa., 1 lot fruit cans, (glass) 1st, dip; Douglass & Co., Detroit, 1 lot Blim's magic dry solder, 1st, dip; Saffel & Baldwin, Tiffin, O., 1 Union churn, 1st, \$5 and dip; Saffel & Baldwin, Tiffin, O., half-dozen grooved wash-boards, 1st dip; Detroit broom factory, 1 lot brooms and whisks, 1st, dip; John W. Amphlett & Co., Detroit, lot Rockingham and yellow ware, 1st, \$5; R. C. Browning, 32 Courland street, New York, 1 lightning meat chopper, 1st, dip; A. Bushnell, 32 Cortland street, N. Y., universal family scales, 1st, \$2; J. K. Boswell, Indianapolis, Ind., 1 clothes-dryer, 1st, dip; Dr. J. H. Belder, Lincoln, Ill., patent perforated washboard, 1st, dip; F. C. Prosser, Detroit, 1 clothes-horse, 1st, \$1; F. C. Prosser, Detroit, 1 clothes line and holder, 1st, dip; Cummings & Ward, Cleveland, O., home washing machine, 1st, dip; N. B. Rowley & Son, Detroit, dairy scales and weights, 1st, \$2; J. K. Boswell, Indianapolis, Ind., 1 fruit dryer, dip.

W. TEACHOUT,

A. BRINK,

MRS. A. BRINK,

MRS. WILEY BRINK,

Committee.

CLASS XXXIV.

Detroit Stove Works, Detroit, cooking stove for wood, 1st, medal; Detroit Stove Works, Detroit, cooking stove for coal, 1st, \$5; Detroit Stove Works, Detroit best parlor or hall stove, 1st, \$7; Detroit Stove Works, Detroit, best self regulating stove for parlor, 1st, \$5; Charles Busch, Detroit, best cooking stove for wood or coal, 1st, \$5; Sales & Pelgrim, Detroit, parlor or hall stove, 1st, \$7; Sales & Pelgrim, Detroit, cook stove for wood or coal, recommended; Sales &

Pelgrim, Detroit, cook stove for wood or coal, recommended; Sales & Pelgrim, Detroit, parlor or hall stove, recommended. D. Kellogg, Detroit, best petroleum stove, 1st, \$5 and dip. D. Kellogg, Detroit, best parlor and chamber stove, 1st, \$5 and dip. D. Kellogg, Detroit, best furniture for petroleum stove, 1st, dip. D. Kellogg, Detroit, best oven for petroleum stove, 1st, dip; M. A. Shipard, Bridgeport, Lawrence, Ill., patent plate holder, dip; M. A. Shipard, Bridgeport, Lawrence, Ill., patent stovepipe boiler dip; M. A. Shipard, Bridgeport, Lawrence, Ill., model center fine kettle, dip; John Grabner, Warsaw, Ind., heat radiator for stoves, dip.

The committee awarded a diploma to the Detroit Stove Works for the best display of assortment of parlor and cooking stoves, for quality and finish of castings, also for hotel cooking stoves, with furniture complete.

F. H. ROSS,
M. HARRIS,
G. S. DEAN,
Committee.

DIVISION E—FIELD AND GARDEN PRODUCTS.

CLASS XXXV.

J. D. Perry, Redford, 1 bushel Diehl winter wheat, 2d, \$2; S. K. Taft, Detroit, 1 bushel winter white wheat, 1st, \$3; S. K. Taft, Detroit, 1 bushel spring white wheat, 1st, \$2; S. K. Taft, Detroit, new variety winter wheat, 2d, \$2; William H. Curry, Salem, 1 bushel oats, (surprise), 1st, \$2; Samuel Rappelye, Ridgeway, 1 bushel winter white wheat, 1st, \$3; Samuel Rappelye, Ridgeway, 1 bushel red wheat, \$3; Samuel Rappelye, Ridgeway, 1 bushel oats, 2d, \$1; Samuel Rappelye, Ridgeway, 1 bushel buckwheat, 1st, \$2; Wm. Hall, Greenfield, variety yellow dent corn, 2d, \$1; Wm. Hall, Greenfield, variety 8-rowed yellow corn, 2d, \$1; Wm. Hall, Greenfield, variety white flint corn, 2d, \$1; John Gilbert, Ovid, 1 bushel red winter wheat, 2d, \$2; John Gilbert Ovid, 1 bushel 4-rowed barley, 1st, \$3; John Gilbert, Ovid, 1 bushel yellow corn, 1st, \$2; John Gilbert, Ovid, variety heads of wheat, 1st, \$2; John Gilbert, Ovid, collections of grain in heads, named and arranged, 1st, \$10; John Gilbert, assortment of ears of corn, 2d, \$3; J. S. Tibbitts, Nankin, 1 bushel yellow corn, 2d, \$1; J. S. Tibbitts, Nankin, 6 stalks yellow dent corn, 2d, recommended; J. S. Tibbitts, Nankin, 12 ears yellow dent corn, 2d, \$1; S. Fenno, Coldwater, 1 bushel white rye, 1st, \$2; John G. Elliott, Grand Rapids, sample hops, 2d, \$2; Henry Hane, Coldwater, sample hops, 1st, \$2.

R. ROOT,
J. H. BUTTON,
Committee.

CLASS XXXVI.

Thos. Blackett, Roseville, 1 peck table potatoes, 1st, \$2; Samuel Rappelye, Ridgeway, 1 peck tomatoes, 1st, \$2; J. A. Barry, Detroit, sample superphosphates, dip; J. A. Barry, Detroit, artificial manure, dip; H. C. Wilcox, Detroit, 12 parsnips, 1st, \$2; Samuel Rappelye, Ridgeway, 1 peck white turnips, 1st, \$2; Samuel Rappelye, Ridgeway, 1 peck yellow sweet turnips, 1st, \$2; James Duncan, Hamtramck, 6 drum-head cabbages, 2d, \$1; James Duncan, Hamtramck, 6 heads cauliflower, 1st, \$2; James Duncan, Hamtramck, best collection of vegetables, \$5; J. S. Tibbitts, Nankin, half-peck Lima beans, 2d, \$1; E. J. Bridge, Detroit, 6 heads drum cabbage, 1st, \$2; Thos. Smith, Hamtramck, 8 Hubbard squashes, 1st, \$2; Thos. Smith, Hamtramck, 12 pie plants, 2d, \$1; A. Lapham, Dearborn, 1 pumpkin vine, 1st, dip; John Ford, Detroit, 12 blood beets, 1st, \$2; John Ford, Detroit, 6 heads cauliflower, 2d, \$1; John Ford, Detroit, half-peck white onions, 1st, \$2; D. S. Heffron, Utica, N. Y., 1 peck early

rose seedling potatoes, 1st, \$2; Daniel Osgood, Detroit, half-peck smooth red tomatoes, 2d, \$1; Daniel Osgood, Detroit, 4 French Turban squashes, 1st, \$2; Daniel Osgood, Detroit, 8 stalks pie plant, 1st, \$2; Thos. A. Parker, Detroit, 12 roots vegetable oysters, 1st, \$3; Thos. A. Parker, Detroit, 3 crookneck squashes, 1st, \$2; Thos. A. Parker, Detroit, 2 vegetable marrow squashes, 1st, \$2; Chauncy Hulbert, Detroit, quarter peck Lima beans, recommended, \$2.

A. C. HUBBARD,

B. M. DAVIS,

W. W. TRACY,

Committee.

CLASS XXXVII—BUTTER AND CHEESE.

Thomas Brabb, Washington, 1 crock (May) butter, 1st, \$8; Thomas Brabb, Washington, 1 crock (Sept.) butter, 2d, \$5; S. Fenno, Coldwater, 20 lbs. butter, (June) 1st, \$6; Maple Grove Factory, Farmington, 40 lbs. cheese, best display, silver medal; Maple Grove Factory, Farmington, 50 lbs. cheese or over, 2d, \$5; Maple Grove Factory, Farmington, 50 lbs. cheese, or under, 1st, \$5; Fowler, Kinne & Co., Reading, 50 lbs. cheese or over, 1st, \$10.

Your committee are of the opinion, that as there is a premium for the best display of cheese from any one factory, and also for the best display of dairy products from any one county, that a factory (alone) should not compete for both premiums, unless said cheese factory is in a collection of other dairy articles from said county.

RUFUS BAKER,

MRS. J. D. HURD,

MRS. H. B. HURD,

Committee.

CLASS XXXVIII—HONEY.

W. Warren, Shelby, Ohio, specimen of honey in boxes, 2d, \$1; J. H. Towaly, Tompkins, specimen of honey in boxes, 1st, \$2; Huff, Jonesville, bee-hive and method of securing honey, 1st, \$5; Huff, Jonesville, specimen of honey in boxes, 1st, \$2; C. J. Sprague, Farmington, 10 lbs. maple sugar, 1st, \$2; C. J. Sprague, Farmington, 1 gallon maple molasses, 1st, \$2; M. McMillan, Detroit, 1 jar (unstrained) honey, 1st, dip.

E. ROOD,

WM. CAMPBELL,

J. O. REICHELE,

A. F. MOON,

Committee.

CLASS XXXIX.

Mrs. E. Perkins, Birmingham, 3 loaves milk or salt-rising bread, 2d, \$3; Mrs. E. Perkins, Birmingham, 2 loaves corn bread, 2d, \$1; Clark Brothers, Detroit, display of varieties of crackers, 1st, dip; M. Leslie, Dearborn, 1 cake of corn bread, 1st, \$2; S. B. Rowley, Philadelphia, Penn., display of large canned fruit, 1st, \$3; S. B. Rowley, Philadelphia, Penn., display of small canned fruit, 1st, \$3; E. M. Lemmon, Detroit, specimen self-rising flour, dip; Lottie Chapman, Reading, specimen brown bread, 1st, \$2; S. Fenno, Coldwater, 3 loaves rye (Ind.) bread, 2d, \$2; G. M. Pettie, Detroit, 1 barrel white wheat flour, dip; Kate Carle, Monroe, 3 loaves salt-rising bread, 1st, \$4; Mrs. Mary Jane Chase, Royal Oak, specimen currant jelly, 1st,

\$3; Abigail Brink, Perrinsville, 2 loaves brown bread, 2d, dip; Charles Summer, Biddle House, Detroit, baker's bread, 1st, medal; Mrs. A. D. Fraser, Detroit, basket of eggs, 1st, dip

W. P. CLARKE,
MRS. M. L. BROOKS,
MISS EMMA MORTON,
MRS. G. S. WAKEFIELD,
Committee.

CLASS XL—WINE AND VINEGAR.

C. F. Allen, Paw Paw, 3 various domestic wines, 1st, \$5; C. F. Allen, Paw Paw, specimen red currant wine, 1st, \$2; C. F. Allen, Paw Paw, specimen strawberry wine, 1st, \$2; C. F. Allen, Paw Paw, specimen blackberry wine, 1st, \$2; C. F. Allen, Paw Paw, specimen elderberry wine, 1st, \$2; C. F. Allen, Paw Paw, specimen rhubarb wine, 1st, \$2; Henry Miller, Detroit, 1 barrel lager beer, 1st, dip; S. Fenno, Coldwater, 1 half-gallon grape wine, 1st, \$2; Mary Jane Chaso, Royal Oak, 1 gallon cider vinegar, 1st, \$2.

W. WING,
WM. GRAY,
C. T. MITCHELL,
W. H. CLEVELAND,
Committee.

CLASS XLI—BITTERS, TOBACCO, SOAPS, ETC.

James Pyle, New York City, O. K. soap, 1st, dip; James Pyle, New York City, saleratus, O. K., 1st, dip; James Pyle, New York City, bluing powder, 1st, dip; G. B. Liechtenburg, Detroit, 8 samples smoking tobacco, 1st, dip; James H. Andrews, Detroit, specimen of cleansing cream, 1st, dip; James H. Andrews, Detroit, specimen of castile soap, 1st, dip; A. Fohl & Co., Detroit, display of cigars, 1st, dip; Frederick Stearns, Detroit, perfumery toilet articles, 1st, dip; S. H. Hall, & Co., Chicago, magic cement, 1st, dip; F. H. Boggs, Detroit, specimen of plug tobacco, 1st, dip; J. M. Seely, Detroit, display flavoring extracts, 1st, dip; W. N. Stelle, Ann Arbor, oil paste blacking, 1st, dip; C. A. Mack, Detroit, sample American oyster sauce, 1st, dip; J. & G. McGregor, Detroit, display of washing soap, 1st, dip; Jas. McBride & Co., Monroe, specimen of chewing tobacco, 1st, dip.

N. B. ROWLEY,
H. ARNOLD,
H. D. SPALDING,
Committee.

DIVISION G—DOMESTIC MANUFACTURES.

CLASS XLII.

Mrs. A. Brink, Perrinsville, double coverlet, 2d, \$1; Mrs. A. Brink, Perrinsville, pair woolen blankets, 1st, \$4; Mrs. A. Brink, Perrinsville, woolen scarf, 1st, \$2; Mrs. A. Brink, Perrinsville, 16 yards fulled cloth, 1st, \$4; Mrs. A. Brink, Perrinsville, 12 yards flannel for dress, 1st, \$4; Mrs. A. Brink, Perrinsville, 4 lbs. stocking yarn, 1st, \$2; Mrs. A. Brink, Perrinsville, pair woolen socks, 1st, \$2; Mrs. A. Brink, Perrinsville, 10 yards satinete, 1st, \$3; Mrs. A. Brink, Perrinsville, pair woolen stockings, 1st, \$1; Mrs. A. Brink, Perrinsville, pair woolen mittens, 1st, \$2; Mrs. J. L. Vaughn, Detroit, patchwork quilt (log cabin), 1st, \$3; Mrs. Frances Leslie, Dearborn, pair woolen stockings, 1st, \$2; Mrs. Dubrick, Detroit, white bed spread, 1st, \$2;

Mrs. M. A. Bremner, Detroit, knitted bed spread, 2d, \$1; Clinton Manufacturing Company, Clinton, 2 lbs. stocking yarn, 1st, \$2; Mrs. Peter Machris, Detroit, patchwork quilt, 2d, \$2; Thomas Brabb, Washington, piece rag carpet, (10 yards) 1st, \$3; Thomas Brabb, Washington, piece cotton and wool hand made flannel, 1st, \$4; Thomas Brabb, Washington, hand spun woolen yarn, 1st, \$2; Mrs. George E. Doolittle, Detroit, piece rag carpet, (32 yards) 1st, \$3; Thomas Brabb, Washington, pair home-made woolen stockings, 1st, \$1; Wm. Will, Fort Gratiot, patchwork quilt, 2d, \$2; Wm. Will, Fort Gratiot, patchwork quilt, 1st, \$3; Mrs. J. M. Eldridge, Flint, white quilt, 1st, \$3; Mrs. A. B. Smith, Farmington, pair cotton stockings, 1st, \$2; Mrs. A. B. Smith, Farmington, brown linen table cloth, 1st, \$2; Mrs. A. B. Smith, Farmington, linen bed-spread, 1st, \$2; Mrs. A. B. Smith, Farmington, linen towel, 1st, \$1; Mrs. A. B. Smith, Farmington, white linen table cloth, 2d, \$1; Mrs. A. B. Smith, Farmington, white linen table cloth, 1st, \$2; Mrs. Joseph Walton, Farmington, greatest display of home-made articles, 1st, \$10; Mrs. A. Brink, Perrinsville, woolen coverlet, (double) 1st, \$2; Mrs. A. Brink, Perrinsville, pair blankets, 2d, \$2; Mrs. A. Brink, Perrinsville, display of home-made cloth, 1st, \$3; Belle Wilcox, Detroit, patchwork quilt, dip; George Wilcox, Detroit, patchwork quilt, dip.

MRS. GEO. HODGES,

MRS. WM. JONES,

MISS H. ADAMS,

Committee.

CLASS XLIII—FACTORY-MADE GOODS.

The committee to whom was referred Class 43, embracing factory-made woolen flannel, etc., manufactured in Michigan, would respectfully report that the samples of goods presented from these exhibitors were so superior in their excellence, so uniform in their value and character, that your committee found it no easy task to discriminate so as to meet the terms of the offered premiums, and yet do no prejudice to exhibitors. They have finally given their awards as follows:

For best display from any woolen factory in Michigan, first premium awarded to Ypsilanti Woolen Manufacturing Company.

For second best display from any woolen factory in Michigan, your committee unanimously decide that, in view of the great difficulty of determining the merits of the product of two competing exhibitors without detracting from either, that the second and third premiums be divided equally between the Clinton Woolen Manufacturing Company, and the Jonesville Woolen Mills of H. R. Gardner & Co.

For the best piece of fancy cassimere, weight 14 ounces or over, first premium, Clinton Manufacturing Company; but your committee unanimously recommend a first-class premium for a piece of cassimere, weight 13 ounces, made by H. R. Gardner & Co., Jonesville Woolen Mills, as of marked excellence, but wanting in weight to meet the requirements of the rule.

For best piece of plain cassimere, weight 14 ounces or over, first premium awarded to Clinton Manufacturing Company.

For the second best piece of fancy cassimere, 14 ounces or over, awarded to H. R. Gardner & Co., Jonesville Woolen Mills.

For best display of flannel from any one factory in Michigan, first premium to Ypsilanti Woolen Mills.

For best piece of overcoat cloth, 14 ounces or over, first premium awarded to H. R. Gardner, Jonesville Woolen Mills.

The committee beg leave to speak most favorably of the entire production in cassimeres of the Ypsilanti Woolen Manufacturing Company, but they are lighter in weight than similar goods by other exhibitors. Your committee beg leave, also, to express their great satisfaction

in view of the marked improvement evidenced by this exhibition, and would highly commend the exhibitors for their energy and good taste in bringing forward this valuable branch of industry.

For display of cotton batting, first premium awarded to Col. M. Flanigan; for handsomest display of carpets, T. F. Abbott; for best and handsomest 5 hearth rugs, T. F. Abbott; for best and handsomest 5 door mats, T. F. Abbott; for finest display of curtains, T. F. Abbott; for finest display of oil cloths, T. F. Abbott; for white woolen blankets, T. F. Abbott.

PHILO PARSONS,
HENRY L. WALL,
S. O. KNAPP,
Committee.

CLASS XLIV—ARTICLES OF DRESS.

Mrs. W. H. Cleveland, Adrian, one gent's dressing gown, \$3; Bottomley & Loud, Romeo, hoop skirts, 1st, dip.

B. H. WELTON,
M. F. PIPER,
MRS. J. JARBOE,
Committee.

CLASS XLV—ARTICLES OF LEATHER AND INDIA RUBBER.

A. R. Morgan, Detroit, specimens of gent's cowhide boots, 1st, \$1; A. R. Morgan, Detroit, specimens of ladies' winter shoes, 1st, \$1; Geo. Rice & Co., Detroit, 1 pair gent's summer boots, 1st, \$1; Geo. Rice & Co., Detroit, display of boots and shoes, medal; R. H. Fyfe, Detroit, 1 pair gent's winter boots, 1st, \$1; R. H. Fyfe, Detroit, 1 pair ladies' summer walking shoes, 1st, \$1; R. H. Fyfe, Detroit, 1 pair ladies' slippers, 1st, \$1; R. H. Fyfe, Detroit, 1 pair gent's slippers, 1st, \$1; Croul Brothers, Detroit, display of leather belting, dip; Croul Brothers, Detroit, display of lace leather, dip; Wolf Brothers, Detroit, 1 traveling trunk, 1st, \$2; Wolf Brothers, Detroit, display of traveling trunks, 1st, \$2; Wolf Brothers, Detroit, 1 traveling bag, 1st, dip; Wolf Brothers, Detroit, display of traveling bags, 1st, \$2; Wolf Brothers, Detroit, 1 ladies' satchel, 1st, \$1; Wolf Brothers, Detroit, display of traveling baskets, \$2; Wolf Brothers, Detroit, 1 valise, 1st, \$1; Geo. Washer, Romeo, 1 trace buckle (Fillmore patent), dip.

S. S. WICKS,
ISAAC CRANE,
L. M. WING,
E. K. SMITHERS,
Committee.

CLASS XLVI—FURNITURE MADE IN MICHIGAN.

Geo. Smith, Detroit, 1 billiard table, 2d, dip; Detroit Chair Factory, 1 set cane seat parlor chairs, 1st, \$3; Detroit Chair Factory, 1 cane seat easy chair, 1st, dip; Detroit Chair Factory, display of cane seat chairs, dip; Henry Weber, Detroit, 1 billiard table, dip, for first-class workmanship; Henry Weber, Detroit, 1 set chamber furniture, 1st, \$10 and dip; Henry Weber, Detroit, 1 bureau, \$3 and dip; Henry Weber, Detroit, 1 sofa, 1st, \$3 and dip; Henry Weber, Detroit, 1 set parlor chairs, 1st, \$3 and dip; Henry Weber, Detroit, display of parlor or drawing-room furniture, 1st, \$10 and dip; Henry Weber, Detroit, one easy chair, 1st, \$5 and

dip; Henry Weber, Detroit, 1 side-board, 1st, \$3 and dip; Whipple Manufacturing Company, Detroit, 1 spring bed-bottom, 1st, dip; Whipple Manufacturing Company, Detroit, 1 car seat, 1st, dip; Whipple Manufacturing Company, Detroit, 1 carriage seat, dip; L. Cahill, Kalamazoo, 1 spiral spring bed, 2d, dip; A. Dondero, Detroit, 1 willow table, 1st, \$5; A. Dondero, Detroit, 1 willow arm chair, 1st, \$5; A. Dondero, Detroit, 1 willow ladies' sewing chair, 1st, \$5; A. Dondero, Detroit, 1 willow workstand, 1st; Jay C. Taylor, Ann Arbor, 1 spring bed-bottom, 3d, dip; Whipple Manufacturing Company, Detroit, 1 car seat, dip; Yeaton & Swain, Detroit, 1 sofa bed, 1st, dip; Yeaton & Swain, Detroit, 1 bed lounge, 1st, dip; C. Schulenberg & Co., Detroit, 1 billiard table, 1st, medal; C. Schulenberg & Co., Detroit, display of billiard table work, dip; Bowerman & Dart, Coldwater, 1 sash lock, dip.

HENRY GILBERT,
R. L. ROOT,
C. H. WETTON,
WM. BROWN,

Committee.

CLASS XLVII—FURNITURE NOT MADE IN THE STATE.

Manly & Calkin, Detroit, 12 cane-seat chairs, 2d and diploma; Smith & Gulterman, Detroit, 1 mattress for bed, elastic sponge, diploma; Smith & Gulterman, Detroit, display of elastic pillows, diploma; Smith & Gulterman, Detroit, 1 display of elastic sponge church cushion, diploma; Smith & Gulterman, Detroit, 1 display of elastic sponge chair cushion, dip; J. R. Hathaway, Westfield, N. Y., 1 metallic burial case, dip; J. R. Hathaway, Westfield, N. Y., 1 metallic burial case, dip.

HENRY GILBERT,
R. L. ROOT,
C. H. WETTON,
WM. BROWN,

Committee.

CLASS XLVIII—ORNAMENTAL IRON WORK.

C. D. Strubel, Detroit, 1 ornamental case iron vase, on pedestal, 1st, \$1; C. D. Strubel, Detroit, 1 iron chair, 1st, \$1; C. D. Strubel, Detroit, 1 display of rustic work, 1st, \$3; C. D. Strubel, Detroit, 1 iron settee, dip; C. D. Strubel, Detroit, one ornamental vase within pedestal, dip; E. T. Barnum, Detroit, one wire counter railing for banking offices, dip; E. T. Barnum, Detroit, one cloth landscape and ornamental window screen, dip.

C. T. MITCHELL,
WM. HEMINGWAY,
A. GLEASON,

Committee.

CLASS XLIX—SEWING MACHINES.

J. V. D. Eldridge & Co., Detroit, best machine for manufacturing purposes, medal; M. B. Cook, Detroit, best and most elegant display of machines, dip; M. B. Cook, Detroit, best double thread sewing machine for family use, medal; M. B. Cook, Detroit, best display of family and fancy work done by one machine, medal.

O. HOSFORD,
MRS. FOWLER,
H. H. COLE,
H. E. PHELPS,

Committee.

diploma; B. Briody, Detroit, 1 case of artificial limbs, \$2; F. Stearns, 1 collection of scales and balances, 1st, diploma; E. T. Barnum, Detroit, display of club skates, 1st, diploma; E. T. Barnum, Detroit, general display of wire goods, 1st, dip; L. Black & Co., Detroit, mathematical instruments, 1st, dip. and \$2; L. Black & Co., Detroit, 1 barometer, 1st, dip. and \$3; L. Black & Co., Detroit, thermometer for all use, 1st, dip; George W. Ladimer, Detroit, collection of burial cases, dip; G. R. Thomas, Detroit, dental work, dip.

M. B. ANDREWS,
WM. H. BROCKWAY,
A. GREEN,

Committee.

SPECIAL REPORT ON GLASS MADE IN MICHIGAN.

The specimens of glass presented by the Detroit Glass Works, being the first samples of this important manufacture ever exhibited to the Michigan State Agricultural Society, and the importance of this product to the industrial resources of the State being recognized, a special committee was appointed, who made the following report:

The special committee, appointed by the President of the Michigan State Agricultural Society, take pleasure in making the following report on the above articles: We find that, for smoothness of surface, whiteness of color and brilliancy, it compares favorably with the best descriptions produced in other States, and is superior to the *imported glass*, with which our markets have hitherto been too freely supplied. It appears that the raw material required in the manufacture of glass is found in abundance in our own State; and it is gratifying to know that extensive glass works have been established here, giving employment to our own artisans. The specimens of glass examined by your committee demonstrate that we have not only the best raw material, but the skilled labor required to produce a superior quality of glass, and these conditions give assurance and promise that this great and useful industry will expand in our midst, and keep pace with the rapid growth of the Northwest. It is believed that with tariff laws affording suitable protection to American labor, we can compete successfully with foreign countries in the production of glass. We recommend that a diploma be awarded to the Detroit Glass Works.

CLASS LII—FANCY AND NEEDLE WORK.

Mrs. E. Perkins, Birmingham, corner bracket of shell work, 1st, \$3; Mrs. M. E. Hude, Detroit, wax flowers, 1st, \$3; Mrs. M. E. Hude, Detroit, leather-work, 1st, \$3; L. Beauchamp, Detroit lace manufactory, cushion, 1st, \$5 and dip; R. C. Wilson, Detroit, hair jewelry, 1st, \$3; R. C. Wilson, Detroit, ladies' and gent's hair wigs, 1st, \$2 and dip; R. C. Wilson, Detroit, hair-work, \$2; Mrs. L. Beauchamp, Detroit, tatting yoke, 1st, \$2; Mrs. L. Beauchamp, Detroit, work box, 1st, \$2; Mrs. M. P. Hude, Detroit, largest collection of embroidery, 1st, \$6; Mrs. M. P. Hude, Detroit, silk embroidery, 1st, \$3; Mrs. M. P. Hude, Detroit, flannel embroidery, 1st, \$3; Mrs. M. P. Hude, Detroit, braided work, 2d, \$2; Mrs. M. P. Hude, Detroit, infant's cloak, 1st, \$2; Mrs. M. P. Hude, Detroit, child's sack, 1st, \$2; Mrs. M. P. Hude, Detroit, display of embroidered handkerchiefs, 1st, \$2; Mrs. M. P. Hude, Detroit, cheniel work, 2d, \$1; F. Leslie, Dearborn, darned stockings, 1st, \$1 and dip; J. Rogers, Detroit, silk embroidery, 1st, \$3; J. Rogers, cheniel work, 1st, \$1; J. Rogers, Detroit, basket of wax flowers, 2d, \$2; Dr. Oakley, Detroit, slipper case, 1st, \$2; Dr. Oakley, Detroit, worsted pin cushion, 2d, \$2; Edith Clark, Ecorse, crochet mats, 1st, \$3; James Hough, Detroit, shell work box, 1st, \$3; M. E. Brenner, Detroit, crochet chair cover, 1st, \$3; C. Sarchen, Detroit, ornamental wreath, 2d, \$1; James Brown, Detroit, chair cover, 1st, \$3; Wm. Keith, Detroit, tatting tidy cover, 1st, \$3; Mrs. Wm. McKenna, Detroit, child's Afghan robe, \$2; Mrs. S. P. Wilcox, Detroit, sea shell

and moss wreath, 1st, \$2; Mrs. S. P. Wilcox, Detroit, sea shell and moss cross, 1st, \$2; Mrs. S. P. Wilcox, sea shell and moss anchor, 1st, \$2; Hortense Messe, Detroit, embroidered night dress, 1st, \$3; Hortense Messe, Detroit, embroidered chemise, 1st, \$2; Hortense Messe, Detroit, embroidered skirt, 1st, dip. and \$3; Hortense Messe, Detroit, sack, 1st, and braided cushion, 1st, \$3; Joseph Keusch, Detroit, pine work, horn of plenty, 1st, \$3; Minnie A. Beck, Detroit, farmer's wreath, 1st, \$2; Robena Ann Morgan, Detroit, two wreaths, special, \$2; Michael Dunn, Detroit, seed wreath, 1st, \$2; Mrs. W. H. Cleveland, Adrian, braided dress, 1st, \$3; Mrs. W. H. Cleveland, Adrian, child's Afghan robe, 1st, \$3; Mrs. W. H. Cleveland, Adrian, beaded mat, 1st, \$3; Mrs. W. H. Cleveland, Adrian, crotchety tidy, 1st, \$3; Mrs. W. H. Cleveland, Adrian, tatting tidy, 2d, \$2; Mrs. W. H. Cleveland, Adrian, gent's crotchety scarf, 1st, \$2; A. M. Aubl, Adrian, large Afghan robe, 2d, \$2; Mrs. Jared Patchen, Detroit, worsted arm chair, 2d, \$2; Mrs. Jared Patchen, worsted camp case, 1st, \$2; J. A. Goodsell & Co., Detroit, display of patterns for ladies and children, 1st, \$2; Mrs. W. L. Berry, Detroit, collection of bead work, 1st, \$5; Mrs. P. Hude, Detroit, embroidered letter case, 1st, \$2; Mrs. P. Hude, Detroit, embroidered yoke, 2d, \$1; Mrs. P. Hude, Detroit, infant's quilt, 2d, \$1; Mrs. P. Hude, Detroit, pin cushion, 2d, \$1; Mrs. E. B. Newhall, Detroit, braided pin cushion, 1st, \$2; Miss Mary E. Newton, Roseville, cone basket, 1st, \$2; Miss Nettie Lansing, Detroit, 2 crotchety sacks, 1st, \$3; Miss Nettie Lansing, Detroit, bead cushion, 2d, \$1; Miss Nettie Lansing, Detroit, child's embroidered skirt, 1st, \$2; Miss Nettie Lansing, Detroit, 4 shirts, made by girls 9 and 11 years old, 1st, \$3; Mary J. Roche, Detroit, 2 hair wreaths, 1st, \$2; Mary J. Roche, Detroit, Afghan robe, 1st, \$3; Patrick Bunninghall, Detroit, basket worsted flowers, 1st, \$3; Nettie W. Meriman, Jackson, worsted picture, 1st, \$2; Ellen Luscom, Detroit, crotchety shawl, 1st, \$3; Mrs. P. Hude, Detroit, 1 pair embroidered pillow cases, 1st, \$2; K. Whitcomb, Detroit, case of leather flowers, 1st, \$2; Mrs. P. Hude, Detroit, embroidered sheet, 1st, \$3; F. L. Beckwith, Cassopolis, flannel embroidery, 1st, \$3; Mrs. Lucy Bloodgood, Cassopolis, embroidered pin cushion, 1st, \$2; Mrs. E. H. Field, Detroit, crotchety tidy and shawl, \$2.

Mrs. L. Beauchamp, added much to the interest of this department in the exhibition of the manufacturing of lace.

Very much credit is due to Mrs. E. H. Fields for her untiring exertions and perseverance in putting up and arranging every article brought to her department from first to last. She stood to her post doing her whole duty to the last. Such services are worthy of notice.

E. S. SILL,

MRS. E. H. FIELD,

MRS. W. G. BECKWITH,

Committee.

DIVISION 1

CLASS LIV—FLOWERS, PROFESSIONAL.

Hiram Simpson, Adrian, greatest variety of roses, 2d, \$3; Hiram Simpson, Adrian, greatest variety of seedling dahlias, dis.; Hiram Simpson, Adrian, collection and display of German Asters, 2d, \$2; Hiram Simpson, Adrian, greatest variety of verbenas, 2d, \$2; Hiram Simpson, Adrian, seedling verbenas not previously exhibited, 1st, \$2; Hiram Simpson, Adrian, round bouquet, 2d, \$1; Hiram Simpson, Adrian, collection of zinnias, dis., \$2; Hubbard & Davis, Detroit, 20 green house plants, 2d, \$5; Hubbard & Davis, Detroit, 10 green house plants, 2d, \$3; Hubbard & Davis, Detroit, greatest variety of flowers, 2d, \$6; Hubbard & Davis, Detroit, greatest variety of dahlias, 2d, \$2; Hubbard & Davis, Detroit, collection of Perennial Phloxes, 1st, \$2; Hubbard & Davis, Detroit, collection of seedling Phloxes, 1st, \$2; Hubbard & Davis, Detroit, greatest variety of Verbenas, 1st, \$3; Hubbard & Davis, greatest collection of seedlings, 2d, \$2; Wm. Adair, Detroit, 20 green house plants, 1st, \$5; Wm. Adair, Detroit, best

variety of roses, 1st, \$5; Wm. Adair, Detroit, best variety of dahlias, 1st, \$4; Wm. Adair, Detroit, 12 dissimilar bloom of dahlias around bouquet, 1st, \$2; Jas. Vick, Rochester, N. Y., greatest variety of dahlias, 3d, \$1; Jas. Vick, Rochester, collection of German Asters, 1st, \$3; Jas. Vick, Rochester, collection of Gladioli, 1st, \$3; Jas. Vick, Rochester, collection of pansies, 1st, \$3; James Vick, Rochester, collection of Antirrhinums, 2d, \$3; James Toms, Ann Arbor, collection of cut flowers, 3d, \$2; James Toms, Ann Arbor, collection of Pansies, 2d, \$3; James Toms, Ann Arbor, collection of Petunias, \$3; John Ford, Detroit, greatest variety of flowers, grouped, 1st, \$10; John Ford, Detroit, greatest variety of Phlox. Perennial, 1st, \$3; John Ford, Detroit, greatest variety of hardy annual flowering plants in bloom, 1st, \$5; John Ford, Detroit, floral design, 2d, \$3; John Ford, Detroit, round bouquet, 1st, \$1; John Ford, Detroit, basket of flowers, 1st, \$2; John Ford, Detroit, flat bouquet, 1st, \$1; H. Simpson, Adrian, collection of Antirrhinums, 1st, \$3; H. Simpson, Adrian, floral design, 1st, \$5.

REV. E. P. POWELL,

MRS. D. MERRIMAN,

MRS. S. O. KNAPP,

J. C. HOLMES,

Committee.

CLASS LV—FLOWERS, AMATEUR.

Mrs. E. Perkins, Birmingham, best variety of flowers, skillfully grouped, 1st, \$10; Mrs. E. Perkins, Birmingham, 12 dissimilar bloom dahlias, 1st, \$3; Mrs. E. Perkins, Birmingham, greatest variety hardy annual flowering plants, 1st, \$5; Mrs. E. Perkins, Birmingham, basket of flowers, 1st, \$1; Mrs. E. Perkins, Birmingham, best flat bouquet, 1st, \$1; Rev. E. P. Powell, Adrian, greatest variety of roses, 1st, \$5; E. P. Powell, Adrian, 6 ornamental leaved plants, 1st, \$5; E. P. Powell, Adrian, greatest variety of dahlias, 2d, \$2; E. P. Powell, Adrian, seedling phlox, perennial, 1st, \$2; E. P. Powell, collection of gladioli, 1st, \$3; E. P. Powell, Adrian, 6 petunias, 1st, \$2; E. P. Powell, Adrian, 6 tropeolums, 1st, \$2; E. P. Powell, Adrian, 6 sin-nons, 1st, \$2; E. P. Powell, Adrian, hardy annual plants in bloom, 2d, \$6; E. P. Powell, Adrian, floral design, dis., \$3; E. P. Powell, Adrian, 2d best basket of flowers, 2d, \$1; E. P. Powell, Adrian, 6 pinks, 1st, \$2; E. P. Powell, Adrian, collection of German Asters, 2d, \$2.

J. C. HOLMES,

MRS. D. MERRIMAN,

MRS. S. O. KNAPP,

Committee.

CLASS LVI—NEW FRUITS AND SEEDLINGS.

C. W. Grant, Ionia, N. Y., variety of Eumelan seedling grapes, 1st, Harris' Insects; Hubbard & Davis, seedling specimen of pears, committee commend a further trial; Wm. Adair, Detroit, seedling summer apples, 1st, Downing's fruit book.

The Pomological Committee, to whom was referred the entries in class 56, have awarded to C. W. Grant, of Ionia, N. Y., the premium offered for seedling grapes for the Eumelan, (No. 130,) Harris' Insects. The committee also examined a supposed seedling grape, shown by R. C. Davis, of Kalamazoo, and by him called "Kalamazoo," but which arrived on the ground too late for entry, and esteem it very promising, so far as they are able to judge, and commend it for trial. A seedling pear (entry 80), shown by Hubbard & Davis, is of fine flavor, but, from the defective or imperfect character of the specimens exhibited, they are unable to do more than recommend its further trial. Entry 71, seedling peach, is too immature to be judged of by the committee. Entries 256, pale fleshed peach, and 245, yellow fleshed peach, are both good, but with no statement of alleged superior qualities, the committee were able to discover

nothing to place them above many already well known varieties. Entry 119, fall-bearing strawberry, does not manifest in the quality, nor yet in the size or appearance of the fruit, qualities that should entitle it to consideration, and the committee suggest that, if valuable at all, that value should be sought in the progeny of which it may become the parent.

The committee award to entry 202, (Wm. Adair) the Society's premium for the best seedling summer apple.

T. T. LYON,
S. O. KNAPP,
I. E. ILGENFRITZ,
B. F. STEER,
Committee.

CLASS LVII—APPLES, AMATEUR.

Samuel Rappelye, Ridgeway, 6 varieties of apples, 1st, \$7; Samuel Rappelye, Ridgeway, lot of autumn apples, 1st, \$4; Samuel Rappelye, lot of winter apples, 1st, \$10; Samuel Rappelye, Ridgeway, 12 specimens of winter apples, 1st, medal; Samuel Rappelye, Ridgeway, 2d 12 specimens of summer apples, 1st, \$2; Samuel Rappelye, Ridgeway, 2d 12 specimens of summer apples, dis., \$5; John Gilbert, Ovid, 12 specimens of single variety summer apples, 1st, \$2; G. R. Hurd, Monroe, exhibit of winter apples, 2d, \$5; Samuel Rappelye, Ridgeway, 12 varieties of apples, including, etc., 1st, \$10; D. Clarkson, Northville, 20 varieties of apples, including, etc., 2d or dis., \$10; Samuel Rappelye, Ridgeway, 20 varieties of apples including, etc., 1st, \$20; G. R. Hurd, Monroe, 12 varieties of apples, including, etc., dis. and \$6; G. R. Hurd, Monroe, 12 single variety of winter apples, 2d, medal; D. Clarkson, Northville, 12 specimens of single variety of summer apples, 2d, \$2; G. R. Hurd, Monroe, 12 specimens of autumn apples, 2d, \$2.

S. M. PEARSALL,
E. M. PLYMPTON.
ISRAEL PENNINGTON,
Committee.

CLASS LVIII—PEARS, AMATEUR.

Rev. E. P. Powell, Adrian, collection of autumn pears, 2d, \$5; W. Sowersby, Detroit, 6 specimens of winter pears, 1st, \$2; S. T. Douglas, Grosse Ile, 8 varieties of autumn pears, 1st, \$3; S. T. Douglas, Grosse Ile, 6 specimen varieties of summer pears, 1st, \$2; Mrs. A. E. Russell, Detroit, 12 or more varieties of pears, etc., 1st, \$10; John Gilbert, Ovid, collection of autumn pears, 1st, \$7.

WM. ADAIR
I. E. ILGENFRITZ,
Committee.

CLASS LIX—PEACHES, PLUMS, AND OTHER FRUITS.

H. B. Chapman, Reading, 6 specimens single varieties of peaches, 1st, \$1; H. B. Chapman, Reading, 6 specimens single varieties of peaches, 2d, \$1; John Gilbert, Ovid, 12 choice varieties of plums, 1st, \$2; Thomas Blanckett, Roseville, 12 quinces, 2d, \$7; W. Sowersby, Detroit,

12 quinces, 1st, \$3; A. Lapham, Dearborn, specimen of watermelons, 1st, \$2; J. W. Pardee, Dearborn, specimen of watermelons, 2d, \$1; John Ford, Detroit, specimen of nutmeg melon, 1st, \$2.

A. WHEELER,
H. B. CHAPMAN,
JOHN T. LIGGETT,
H. DALE ADAMS,
Committee.

CLASS LX—APPLES, PROFESSIONAL.

I. E. Ilgenfritz & Co., Monroe, specimen of autumn apples, 1st, \$6; I. E. Ilgenfritz & Co., Monroe, specimen of winter apples, 1st, \$10; I. E. Ilgenfritz & Co., Monroe, 12 specimen single varieties of autumn apples, 1st, \$3; I. E. Ilgenfritz & Co., Monroe, 12 specimen single varieties of winter apples, 1st, \$3; I. E. Ilgenfritz & Co., Monroe, 12 quinces, 1st, \$3.

JOHN STARKWEATHER,
SAMUEL RAPPELYE,
Committee.

CLASS LXI—PEARS, PROFESSIONAL.

Hubbard & Davis, Detroit 12 varieties of pears, 3d, \$3; Hubbard & Davis, Detroit, 3 varieties of pears, 3d, \$3; Hubbard & Davis, Detroit, 5 variety of pears, 2d, \$2; Hubbard & Davis, Detroit, collection of summer pears, 1st, \$2; Hubbard & Davis, Detroit, collection of autumn pears, 2d, \$2; I. E. Ilgenfritz & Co., Monroe, 12 variety of pears, including a proper, etc., 1st, \$10; I. E. Ilgenfritz & Co., Monroe, 8 varieties of pears, including a proper, etc., 1st, \$3; I. E. Ilgenfritz & Co., Monroe, collection of autumn pears, 1st, \$3; I. E. Ilgenfritz & Co., Monroe, 6 specimen of summer pears, 1st, \$2; I. E. Ilgenfritz & Co., Monroe, 6 specimens of autumn pears, 1st, \$2; I. E. Ilgenfritz & Co., Monroe, 6 specimens of winter pears, 1st, \$3; Wm. Adair, Detroit, 12 varieties of pears, 2d, \$7; Wm. Adair, Detroit, 8 varieties of pears, 2d, \$3; Wm. Adair, Detroit, 5 varieties of pears, 1st, \$2.

W. B. HUNTER, *Chairman.*

CLASS LXII—PEACHES AND OTHER FRUITS.

Samuel Hoppin, Breedsville, collection of peaches, 1st, \$3. The committee also award to Mr. Hoppin, for his display of canned fruits a year old, preserved without sugar, as follows: Samuel Hoppin, Breedsville, specimen of canned peaches, without sugar, 1st, \$2; Samuel Hoppin, Breedsville, specimen of canned peaches, this year, 1st, \$2; Samuel Hoppin, Breedsville, specimen canned cherries, without sugar, 1st, \$2; Samuel Hoppin, Breedsville, specimen of canned Siberian crab apple, without sugar, 1st, \$2.

A. WHEELER,
H. B. CHAPMAN,
JOHN T. LIGGETT,
Committee.

CLASS LXIII—GRAPES, PROFESSIONAL AND AMATEUR.

B. McCreery, Detroit, best and most extensive collection of native hybrid grapes, 1st, \$6; Hubbard & Davis, Detroit, 2d best and most extensive collection of native or hybrid grapes, 2d, \$3; Diedrich & Breisacher, Monroe, best 8 varieties native grapes, 1st, \$3; G. R. Hurd,

Monroe, best single variety of native grapes, 1st, \$2; B. McCroery, Detroit, best collection of foreign grapes, 1st, \$8; Hubbard & Davis, Detroit, 2d best collection foreign grapes, 2d, \$3; Hubbard & Davis, Detroit, best 6 varieties foreign grapes, 1st, \$4; Michael Puhl, Detroit, best 3 varieties foreign grapes, 1st, \$2; Hubbard & Davis, Detroit, best single variety foreign grapes, 1st, \$1.

T. T. LYON, *Chairman.*

DIVISION K.

CLASS LXIV—MISCELLANEOUS.

H. Brewer & Son, Tecumseh, 1 drain tile machine, \$10; W. A. Carpenter, Detroit, 1 Union planer, medal; Samuel J. Gidday, Detroit, 1 specimen of slate roofing, dip; G. B. Smith, Detroit, specimen stone plaster, dip. and \$2; G. B. Smith, Detroit, a barrel of ground plaster, dip. and \$2; Austin Burt, Detroit, specimen iron ore, dip. and \$2; Austin Burt, Detroit, specimen of manufactured pig iron, honorable mention; Austin Burt, Detroit, specimen of mineral paint, dip; Thomas Daniels, Toledo, 1 Daniels' patent soda fountain, dip; Lane & Bodley, Cincinnati, 1 portable circular saw mill and engine, dip; Lane & Bodley, Cincinnati, 1 lathe machine, dip; Lane & Bodley, Cincinnati, 1 cut off saw for general use, dip; Lane & Bodley, Cincinnati, display of hangings and fixtures for circular saws, dip; Dewey & Weller, Detroit, 1 railroad and farm gate, dip; Thos. F. Shaw, Tiffin, O., ditching machine for tile, Sawyer & Barber's, dip; Joseph Parks, Detroit, display of wood turning, dip; Thos. B. Roberts, Detroit, 1 double hung counter-balance sash and frame, dip; Fulton Iron and Engine Works, Detroit, 1 detached portable circular saw mill and engine, dip; Fulton Iron and Engine Works, Detroit, 1 patent leather lime extractor and filter combined, dip; Thos. W. Dorwent, Fort Wayne, Ind., 1 portable steam cross-cut sawing machine, dip; H. & O. Granger, Memphis, 1 Brett's cave trough former, dip; G. S. Wormer & Son, Detroit, 1 double cylinder planer and matched beader (iron frame,) dip; G. S. Wormer & Son, Detroit, 1 sticker with brass head, medal; G. S. Wormer & Son, Detroit, 1 receiving machine dip; G. S. Wormer & Son, Detroit, 1 power morticing machine, medal; G. S. Wormer & Son, Detroit, 1 foot morticing machine, medal; G. S. Wormer & Son, Detroit, 1 scroll saw machine, dip; G. S. Wormer & Son, Detroit, 1 tenoning machine, dip; G. S. Wormer & Son, Detroit, 1 four side moulding machine, dip; G. S. Wormer & Son, Detroit, 1 self-oiling saw arbor, dip; G. S. Wormer & Son, Detroit, 1 sash blind still boring combined, dip; G. S. Wormer & Son, Detroit, 1 heading turner, dip; G. S. Wormer & Son, Detroit, 1 heading and cabinet planer, dip; G. S. Wormer & Son, Detroit, 1 shingle and heading machine combined, dip; G. S. Wormer & Son, Detroit, 1 heater and lime catcher, dip; G. S. Wormer & Son, Detroit, 1 Greenwood foot jointer, dip; G. S. Wormer & Son, Detroit, 2 steam gauges, dip; G. S. Wormer & Son, Detroit, 1 Snow's improved safety governor, dip; G. S. Wormer & Son, Detroit, 1 stave equalizer dip; G. S. Wormer & Son, Detroit, 1 shingle wheel jointer, dip; G. S. Wormer & Son, Detroit, 1 shingle and heading wheel jointer, dip; G. S. Wormer & Son, Detroit, 1 gauge lathe, dip; G. S. Wormer & Son, Detroit, 1 upright shaping machine, dip; G. S. Wormer & Son, Detroit, 1 reg. seal cutting machine, dip; G. S. Wormer & Son, Detroit, 1 engine lathe, dip; G. S. Wormer & Son, Detroit, 1 power iron planer, dip; G. S. Wormer & Son, Detroit, 1 matcher head setter, dip; G. S. Wormer & Son, Detroit, 4 samples American fence, 2d premium; G. S. Wormer & Son, Detroit, 1 Woodward steam pump, dip; G. S. Wormer & Son, Detroit, 1 steam engine and saw mill, dip; G. S. Wormer & Son, Detroit, 1 improved lathe machine with bolt saw attached, dip; G. S. Wormer & Son, Detroit, 1 portable grinding, Queen of the South, dip; G. S. Wormer & Son, Detroit, 1 improved stave cutter, dip; G. S. Wormer & Son, Detroit, 1 American sheep shearer machine, dip; Frank Sommer, Detroit, 1 union fence, 1st premium, dip; J. D. Shang, Dayton, Ohio, 1 gas machine, dip; C. D. Rice & Co., Chicago, 1 chemical fire engine, disc'y premium, dip; W.

S. Canfield, Detroit, 1 Richey's metallic self-acting lubricator, disc'y premium, dip; J. A. Cleveland & Co., Lafayette, Ind., 1 screw cutting machine, dip; Chas. Mudge, Ovid, 1 scaffold for working on roof of building, dip; Chas. Mudge, Ovid, 1 scaffold for working on side of building, dip; N. Brittan & Co., Coldwater, 1 continuous copper stick lightning conductor, dip; W. Johnson, Detroit, 1 soda fountain, 1st premium, dip; Mechanics' and Inventors' Association, Detroit, Burns' lightning rod, dip; Mansfield Machine Works, Mansfield, O., 1 double circular saw mill and steam engine, dip; D. Wilkie & Son, Detroit, samples of tinmiths' and plumbers' No. 1 solder, dip; D. Wilkie & Son, Detroit, samples of tinmiths' and carpenters' scratch awls, dip; Pierce & Co., Buffalo, two block shingle machines, medal; Mechanics' and Inventors' Association, Detroit, 1 weather-proof window blind, dip; Bowlinger Fitch, Detroit, 1 portable blacksmith's forge, dip. and premium; Burnham & Co., Battle Creek, 1 fluter and chamferer, recommended; J. W. Penfield, Willoughby, O., 1 machine for making tile, dip. and \$10; Wm. W. Pratt, Jonesville, 1 Andrews & Kalbach hydraulic water wheel, recommended; M. C. Payment & Son, Sugar Island, lot of machine made shingles, disc'y; Johnston & Phillips, Ann Arbor, specimen of cement roofing, 1st premium, medal; Johnston & Phillips, Ann Arbor, concrete or artificial stone, dip; Ayres, Learned & Wiswell, Port Austin, $\frac{1}{2}$ barrel salt, (kettled,) dip. and \$5; Ayres, Learned & Wiswell, Port Austin, $\frac{1}{2}$ barrel salt (solar), dip. and \$5; Stout, Mills & Temple, Dayton, Ohio, American Turbine water wheel, 1st premium, dip; E. B. Ward, Detroit, specimen of iron ore, 1st premium; E. B. Ward, Detroit, specimen of steel rails, 1st premium; E. B. Ward, Detroit, specimen of steel wrought, cold, 1st premium; E. B. Ward, Detroit, specimen of Lake Superior iron, cold, 1st premium; E. B. Ward, Detroit, specimen of steel headed nails, 1st premium; E. B. Ward, Detroit, specimen of charcoal plate, 1st premium; F. C. Prosser, Detroit, specimen of concrete stone, dip; James Jenks, Detroit, engine and boiler, medal; James Jenks, Detroit, direct action saw mill, dip; James Jenks, Detroit, shingle machine, medal; James Jenks, Detroit, scroll saw, dip; James Jenks, Detroit, steam pump, dip; James Jenks, Detroit, heading turner, dip; James Jenks, Detroit, M. machine made shingles, dip. and \$12; James Jenks, Detroit, Hunt's patent steam packing piston head, dip; James Jenks, Detroit, set of works for circular saw mill, dip; John Forrest, Nevada, Wyandotte county, Ohio, a grain totter, medal; F. M. Matice, Detroit, tile draining, (2 rods) \$10; J. C. McKenzie, Adrian, specimen of brick made by machine, dip; Fulton Iron Engine Works, Detroit, 1 stationary engine, dip; Fulton Iron Engine Works, Detroit, 1 double portable saw mill, 1st premium; T. Flagler, Grass Lake, carriage bolt and rivet cutter, dip; C. J. Conrad, Adrian, improved serpentine wire worm for blacksmith's bellows, dip; Lewis Wenks & Co., Detroit, stone or quicklime, dip; Japeth Cross, Adrian, improved weather strip, dip; Geo. F. Tiffany, Jackson, specimen of fire brick sewer pipe and drain tile, dip.

SPECIAL REPORT ON SAW MILLS AND MACHINERY.

A special committee, consisting of E. S. Sill, of Monroe, and Austin Wales, of Erin, was appointed to examine and report upon the saw mills and machinery of that class, and these gentlemen made the following report:

Your committee, in the examination of the several mills exhibited, find ourselves in much doubt, when we take the several merits of this class of machinery into consideration.

Messrs. Lane, Bodley & Co., of Cincinnati, Ohio, exhibited in most thorough working order, an engine, saw mill, lath mill, a cut-off saw, and setting apparatus. The saw mill was of a very superior character, and deserves great consideration, but taking its cost into consideration with its other merits, we are obliged to give it the second position. The lath mill beats any one we ever saw, and is entitled to a first premium. The cut-off is also superior, and we award it the first premium. The setting apparatus is also awarded the second premium.

Mr. James Jenks, of Detroit, presented the saw mills of Sharps, Davis & Bonsall, also a shingle mill and setting apparatus. This mill we find equal in every respect to any shown, and on taking its cost into consideration, we find ourselves obliged to award it a first premium.

The shingle mill is far superior to any one we ever saw, and must award it a first premium, and also a like premium to the setting apparatus, which is very simple and good.

In awarding these premiums, we take no pretensions to judge with the skill and accuracy of able mechanics, but give our report upon what we examined, honestly.

SPECIAL REPORT ON IRON AND STEEL.

The special committee to examine and report on the steel and iron on exhibition by Capt. E. B. Ward. The steel is manufactured at Wyandotte, from the iron ores of Lake Superior, by what is known as the Bessemer process, and is called Bessemer steel. The specimens of T rail and boiler plate are very fine, and are of a superior workmanship. Other specimens of steel are wrought into various devices, and show their ductility and tenacity, which is very extraordinary, and worthy of favorable notice and commendation. The iron is of a superior quality, the ductility and tenacity of which is well known.

CLASS LXV—MODELS AND INVENTIONS.

Mechanics' & Inventors' Association, Detroit, 1 collection models, dip; Mechanics' & Inventors' Association, Detroit, D. Kelly's weather-proof window-blind, honorable mention; Mechanics' & Inventors' Association, Detroit, 1 Tower's flower carrier, (model) honorable mention; Mechanics' & Inventors' Association, Detroit, Hallet's hand brick machine, honorable mention; Mechanics' & Inventors' Association, Detroit, Falsom's Fumigator, honorable mention; Mechanics' & Inventors' Association, Detroit, Boardman's wagon axle, dip; Mechanics' & Inventors' Association, Detroit, Priest's wagon box, honorable mention; Mechanics' & Inventors' Association, Detroit, Withey's adjustable arm rest, honorable mention; Mechanics' & Inventors' Association, Detroit, Flester's printing wheel, honorable mention; Mechanics' & Inventors' Association, Detroit, Linton's chuck, dip; Mechanics' & Inventors' Association, Detroit, Wentworth's stake-holder, dip; Mechanics' & Inventors' Association, Detroit, Branford's saw tooth, dip; Mechanics' & Inventors' Association, Detroit, Nelson's punch, \$3; Charles Wisdom, Brownstone, full-rigged bark, (ship) dip; John Flint, Detroit, 1 small ship, dip; Parry & Brooks, Detroit, 1 rotary excelsior cutting machine, (model,) dip; Geo. S. Aker, Kalamazoo, 1 burglar alarm, honorable mention; Fairbank, Greenleaf & Co., Chicago, 1 Baldwin's improved till lock and drawer, dip; Anzell & Ketch, Adrian, working model brick machine, dip; A. Latourette, Waterloo, N. Y., ditching machine, dip; Fred. J. Jones, Detroit, adjusting belt hook, dip; Amos Putnam, Big Bend, Wis., model for feeding sheep, patented, dip; R. Fulton, Catskill, N. Y., Sanford's reciprocating reaper and mower grinder, dip; F. C. Prosser, Detroit, model mould for concrete brick, honorable mention; Wm. Earl, Jr., Troy, N. Y., American sheep-shearer machine, dip; F. M. Briggs, Plymouth, Briggs' patent lamp for destroying worms and insects on trees, dip; E. H. Estell, St. Louis, Estell's lever saw sett, dip; C. W. Coe, Fenton, Coe's self feeding upright drill and screw-cutting machine, dip; Black & Alstaker, Hamilton, O., box of sickles and sections, dip; Geo. D. McKluney, Detroit, accommodation ruler, paper-cutter and eraser, honorable mention; A. M. R. Fitzsimmons, Reading, boot crimp, honorable mention; Mechanics' & Inventors' Association, Detroit, 1 Linton combination tool holder, dip; J. C. McKenzie, Adrian, improved brick machine, horse or steam power, dip; Henry Fowler, Detroit, 1 dozen band boxes, 1 dozen ladies' hat boxes, 1 dozen gentlemen's boxes, 1 dozen shelf boxes, 1 show-case full of perfumery, and druggists' boxes, 1 dozen muff and collar boxes, combined in one, 1 dip. on lot; D. E. & A. M. Atkins, patent splint and slat butter, dip; M. A. Hamilton, Detroit, tea and coffee float, dip; Gleason & Co., Hilldale, one show case containing steel stencil, dies and stamps, dip; A. C. Chubb, Grand Rapids, model of a flexible steam roller, honorable mention; B. W. Conway, Port Huron, 1 spoke and felloe coupling, dip; C. C. Collins, Niles, model of self-adjusting sash supporter

and lock combined, dip, — Hart, Detroit, 1 patent Green's combination letter safe, dip; L. B. Forrester, Clyde, hose and pipe coupling, dip.

E. B. ROOT,
P. D. BECKWITH,
E. F. BENEDICT,
Committee.

PROCEEDINGS OF THE EXECUTIVE COMMITTEE OF THE MICH. STATE AGRICULTURAL SOCIETY,

AT ITS ANNUAL MEETING AT DETROIT, JANUARY 26, 1869.

In compliance with the notice given by the President of the Michigan State Agricultural Society, the members of the Executive Committee met at the Biddle House on the evening of Monday, January 25, 1869, and a quorum of the members not having arrived, the meeting was postponed till the next day at 10 o'clock A. M., when the President called the meeting to order, and the following members were present:

W. G. Beckwith, President; E. O. Humphrey, Treasurer; W. J. Baxter, of Jonesville; L. S. Scranton, Grand Rapids, John Gilbert, Ypsilanti; Wm. Adair, Detroit; J. A. Walter, Kalamazoo; G. W. Phillips, Romeo; S. B. Wakefield, Monroe; A. J. Dean, Adrian; M. Shoemaker, Jackson; E. W. Rising, Richfield; E. N. Willcox, Detroit; and R. F. Johnstone, Secretary.

The President made the following address:

During the past year the receipts into the treasury of the society have been \$11,909, which, with the amount of bonds on hand Jan. 1, 1868, make an aggregate of \$15,994. Our expenses during the same period have been \$14,759, leaving in the treasury for future use an unexpended balance of \$1,235. For further and full particulars in regard to the management of our finances during the past year, I refer you to the Secretary's and Treasurer's reports.

In this connection, permit me to suggest the propriety of permanently locating a place for holding our State Fairs. I do this with a view to save to the society the usual annual outlay for buildings and preparation of grounds. You all well understand that a considerable sum is paid out every year for the purposes just mentioned, which, if saved to the society, and distributed as premiums, would do much towards increasing its interest and usefulness. It remains for you, gentlemen, to say what action, if any, shall be taken in the premises.

It gives me pleasure to state that Messrs. Moore, Foote & Co., of Detroit, have offered a premium of \$400 for the best five acres of wheat grown in the State during the year 1869, the premium to be awarded under the supervision of the society. This example, so worthy of imitation by our capitalists and large business houses, cannot fail to be duly appreciated by the farming community throughout the State.

I would call your attention to the necessity of encouraging the formation of county and township clubs for the discussion of all questions that relate to the management of stock, the culture of various soils, and farm improvement generally, such as orchards, buildings, fences, etc. I find the interest in this direction growing, and believe *you* may do much toward stimulating further and increased action among our farmers in all parts of the State. Mechanics associate together with a view to mutual advancement and profit; so do tradesmen; so do men of other callings; why not the farmer? The time was, when the uneducated and ignorant resorted, in the main, to agriculture as a means of bettering their condition in life. Now our farmers are, to a large extent, educated; and as a general rule, the best educated are the most thrifty and successful. At the present day, it does not unfrequently happen, that those who by indolence and want of proper mental culture are unfitted for agricultural pursuits, resort in the end to some one of the learned professions as a means of livelihood. The professions lose much of character by such accessions, while the farming community gain somewhat by the loss.

I would call your attention once more to the necessity of encouraging the mechanical interests of the State. These interests, second only in importance to agriculture, have a right to demand a large share of your consideration; also, your active coöperation, so far as bringing them prominently before the public is concerned. As a Society, we may offer premiums to the Michigan mechanic. As individuals, we may do more than this; our influence may be exerted in his behalf on all suitable occasions; we may purchase ourselves, as well as recommend his wares to others. When quality and price compare favorably with foreign products of the same kind, there can be no good reason given why our own mechanic should not be preferred. Take for example woolen goods of Michigan manufacture. So far as I am able to judge, our mechanics can compete favorably with those of the Eastern States in regard to style, quality and prices. If this be so, why not more heartily espouse their cause as against the overgrown factories of those States? It is our duty to do so. In order, therefore, to give an earnest of our sympathy and good wishes to the manufacturers generally of Michigan, I propose that the Executive Committee of this Society appear at the next annual fair clad in garments of Michigan manufacture throughout.

In regard to the manufacture of agricultural implements, probably no one of the Northwestern States excels ours. Then let us purchase at home, and save our money for circulation amongst ourselves, rather than take it abroad to enrich other communities, the rivals of our friends and neighbors. If the buyer believes that the manufacturer desires to meet him on fair grounds, by making a good article, and placing upon it a fair profit, there is nothing to hinder the increase of our manufactures, and the amount of capital invested in them. Mutual confidence between buyer and seller must exist if we would facilitate trade at home or with foreign parties.

I cannot urge too strongly upon our farmers the necessity of paying more attention to stock of all kinds, than they do at present. Almost every farmer has a certain amount of coarse feed sufficient to winter in fair condition a certain number of cattle and sheep, and which, if not fed out, is liable to waste, if not to entire loss, even as manure. An economical arrangement of fields will also afford sufficient pasture for them during the summer and fall. I know it is urged by many that the low price of stock will not justify them in trying to raise or keep it. I am willing to admit that if the laws of trade had irrevocably fixed the price of sheep and wool for all time to come at the prices paid during the past six months, there would be some show of reason why we ought not to look to sheep and wool as a source of profit; but such is not the case; everything, every article or commodity is liable to the inevitable laws of trade—to those rules which govern supply and demand. As to the quantity and kind of stock one should keep, he must be governed by the size of his farm, its adaptation to stock, and surrounding circumstances; in other words, he must use good judgment in this as in other matter that relates to farm management. It is believed by some that not less than 80,000 sheep have been slaughtered in Michigan during the past fall and winter; no reason is assigned for this wholesale work, except the low price of that kind of stock. I am of opinion that no better time will be found than now in which to start new flocks of sheep with profit to the beginner; nor do I believe the price of wool will for many years rule so low as during the last fall. To farm well, which, in my opinion, means to farm profitably, no farmer can dispense with a certain amount of stock of cattle, sheep, horses and hogs.

Permit me to call your attention to the State Agricultural College for a few moments. That Institution, although richly endowed by the general and State Government, in my opinion, falls short of what the farmers of Michigan have a right to expect from it. The general impression is that this institution *should* thoroughly fit our young men for agricultural pursuits; in other words, it should so educate as to inspire them not only with the profits, but the nobility of the farmer's occupation.

That it has failed to do this, is apparent from the fact that not more than one out of four of our young men who graduate there embark in agricultural pursuits after leaving school. If its course of study, or general management, has had the effect to induce farmers' sons to abandon the occupation of their fathers, then it seems to me to have failed to accomplish what its founders intended. Where the fault is, I will not presume to say, but this I do most earnestly suggest, that you, by resolution or otherwise, respectfully ask the Legislature now in session to investigate its affairs and management, with a view to effect a change for the better.

It does seem to me that this Institution, with 240,000 acres of valuable land under its control, given by the General Government, and with 6,000 acres more given it by the State, should not be supported from year to year by direct appropriations from the State Treasury, unless it can show to the tax-payers of Michigan corresponding benefits in the shape of soundly, practically educated young farmers. If its general management or course of study tends to shut out the sons of small farmers, or those in limited circumstances, certainly a radical change should at once be entered upon. These remarks are made in no spirit of fault-finding, but from a desire to see the College made a model school of its kind. Frequent conversations with men of good judgment in various parts of the State, induce me to believe that the time has come when something should be done to rescue the College from the policy which deprives it of public sympathy and support. It is thought by many that the lands under its control should be sold, and the proceeds put at interest for the maintenance of the school; thus opening to actual settlers a large amount of lands from which, at an early day, the State might derive an income in the shape of taxes, etc. To hold these lands for high prices is but to adopt the speculator's policy, which has always proven hurtful to the progress of new States.

It would, perhaps, seem out of place for me, at this time, to enter at length into arguments in support of the several suggestions made; I would, therefore, merely lay them before you for your consideration, believing that your action in the premises will result in much good to the Society, and consequently to those great interests which you represent.

The Secretary then read the annual report of the business of the Society for the year 1869, which is as follows:

To the President and Executive Committee of the Michigan State Agricultural Society:

The Secretary submits the following report as a statement of the business of the Michigan State Agricultural Society, for the year ending December 31, 1868:

At the close of the year 1867, there remained on hand, according to the report then made, the following amounts, after all accounts and expenses had been paid up to the 31st of December that had been presented and audited:

Invested in U. S. bonds,.....	\$2,000 00
Building fund of museum,.....	3,250 00
Balance of cash in hands of Treasurer,.....	1,064 40
Total funds on hand Jan. 1, 1868,.....	<u>\$7,304 40</u>

During the year there has been received the following amounts from the various sources named, viz:

From proceeds of tickets at the State Fair,.....	\$7,444 10
“ interest, &c.,.....	118 00
“ Detroit subscription funds, net,.....	2,784 83
“ rents,.....	948 00
“ entries at Secretary's office,.....	767 00
“ sundries,.....	7 00
Total receipts for 1868,.....	<u>12,018 52</u>
	<u>\$19,317 93</u>

The expenditures during the year 1868 have been as follows:

Premium checks issued for awards made in 1867,.....	\$242 00
Premium checks issued for awards of 1868,.....	5,144 00
Citizens' premiums for awards of 1868,.....	1,005 00
Business checks for accounts of 1867,.....	808 88
Business checks for expenses of 1868,.....	7,625 82
	<u>\$14,819 00</u>
Deduct the amount invested in Normal School building and granted to the State Board of Education at winter meeting of 1868,.....	3,250 00
	<u>18,069 00</u>
Balance remaining after all checks outstanding are paid,.....	\$1,248 03
Uncollected rent due,.....	80 00
The Society also owns the buildings, fixtures and dock on the present fair ground at Hamtramck, which are of the same value as they were last year, having had additions made to them the past year to the amount of \$1,200,.....	<u>13,407 24</u>
Total avails of the Society January 1, 1869,.....	<u>\$14,655 27</u>

The details of the expenses of the Society have been classified and arranged under the following heads. The items will be found on the schedule of checks accompanying this report:

1. Accounts of expenses of 1867,.....	\$903 68
2. Winter meeting of Executive Committee,.....	224 95
3. Summer meeting,.....	186 00
4. Construction and preparation of Fair Grounds, lumber and shingles,.....	\$432 64
Nails and hardware,.....	51 90
Other materials and labor pay rolls,.....	819 62
	<u>1,304 06</u>
5. Postage and express charges,.....	200 00
6. Cartage and fair expenses,.....	46 83

7. Rents of Fair Grounds and office,.....	\$550 00
8. Decoration of buildings and grounds,.....	145 76
9. Marshals, gate keepers and superintendents,.....	264 60
10. Hay and straw,.....	488 70
11. Meals for committees and officers,.....	362 50
12. Grain and feed for live stock,.....	79 60
13. Transportation of military,.....	135 00
14. Music,.....	25 25
15. Steam engine, wood, and fixtures,.....	236 30
16. Water and pumps,.....	167 00
17. Labor on track,.....	37 00
18. Assistant Secretaries,.....	253 50
19. Bill posting,.....	19 50
20. Printing premium lists,.....	233 00
21. Printing posters, circulars, cards, tickets, &c.,.....	701 17
22. Stationery,.....	96 10
23. Miscellaneous, ribbons, dynamometer, &c.,.....	112 00
24. Cost of medals, diplomas,.....	345 40
25. Salary of Secretary,.....	1,000 00
26. Expenses of Treasurer,.....	195 00
27. Insurance,.....	104 00
28. Carriage hire for Business Committee,.....	52 00
Total,	<u>\$3,428 00</u>

The premiums awarded and checks issued on the several classes during the year 1868, are reported as follows, viz:

DIVISION A.—CATTLE.

Class.

1. Short-horns,	\$355 00
2. Devons,	367 00
3. Herefords,	120 00
4. Ayrshires,.....	40 00
5. Alderneys and Galloways,.....	40 00
6. Herds,.....	125 00
7. Grade cattle,.....	110 00
8. Working cattle,.....	97 00
9. Fat cattle,.....	47 00
	<u>\$1,301 00</u>

DIVISION B.—HORSES.

10. Thoroughbreds,.....	\$220 00
11. Part thoroughbreds,.....	235 00
12. Horses of all work,.....	429 00
13. Roadsters and trotting horses,.....	536 00
14. Draught horses,.....	62 00
15. Carriage and buggy horses,.....	109 00
16. Saddle horses,.....	25 00
17. Matched horses,.....	60 00
18. Jacks and mules,.....	88 00
	<u>1,694 00</u>
Class for trials of speed,.....	1,005 00

DIVISION C.—SHEEP, SWINE, AND POULTRY.

19. Spanish Merinos,.....	\$108 00	
20. Michigan fine wools,.....	76 00	
21. Southdowns and other middle-wooled sheep,.....	108 00	
22. Leicester, Cotswold, and other long-wooled sheep,.....	114 00	
23. Fat sheep,.....	41 00	
24. Swine,.....	66 00	
25. Poultry,	26 00	
		1,583 00

DIVISION D.—FARM IMPLEMENTS AND THEIR TRIALS.

26. Plows, plowing matches, &c.,.....	\$54 00	
27. Harrows, cultivators, scarifiers, &c.,.....	22 00	
28. Seed drills, sowers, planters, &c.,.....	4 00	
29. Haying and harvesting implements,.....	3 00	
30. Apparatus and machinery connected with, &c.,.....	6 00	
31. Wagons, carriages, and sleighs,.....	110 00	
32. Barn-yard articles,.....	11 00	
33. Dairy and household articles,.....	21 00	
34. Stoves and holloware,....	89 00	
		270 00

DIVISION E.—FIELD AND GARDEN PRODUCTS.

35. Grain, flour, meal, and seeds,.....	\$54 00	
36. Roots and vegetables,.....	44 00	
		98 00

DIVISION F.—DAIRY AND HOUSEHOLD MANUFACTURES.

37. Butter and cheese,.....	\$41 00	
38. Sugar, honey and bee-hives,.....	14 00	
39. Bread, preserves and pickles,.....	22 00	
40. Wines, vinegars, cordials, &c.,.....	19 00	
		96 00

DIVISION G.—MANUFACTURES.

42. Home made,.....	\$86 00	
43. Factory made,.....	83 00	
44. Articles of dress,.....	3 00	
45. Articles of leather and india rubber,.....	18 00	
46. Articles of furniture manufactured in Michigan,.....	50 00	
48. Ornamental iron work,.....	4 00	
		244 00

DIVISION H.—FINE ARTS, NEEDLEWORK, &c.

50. Paintings, statuary, photographs, &c.,.....	\$120 00	
52. Clocks, jewelry, plated-ware, cutlery, &c.,.....	22 00	
53. Needle, wax, shell, and other fancy work,.....	177 00	
		323 00

DIVISION I.—FLOWERS AND FRUITS.

54. Flowers, professional list,.....	\$111 00	
55. Flowers, amateur list,.....	57 00	
57. Apples, amateur list,.....	81 00	
58. Pears, amateur list,.....	29 00	
59. Peaches, plums, and other fruits,.....	14 00	
60. Apples,.....	26 00	
61. Pears,	46 00	
62. Peaches, plums and other fruits,.....	8 00	
63. Grapes, professional and amateur,.....	32 00	
		403 00

DIVISION K.

64. Miscellaneous articles,	\$49 00
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DIVISION L.

Winter premiums,	242 00
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These premiums sum up by divisions as follows:

Division A. Cattle,	\$1,301 00
" B. Horses,	1,824 00
" C. Sheep, swine and poultry,	533 00
" D. Implements and their trials,	270 00
" E. Field and garden products,	98 00
" F. Dairy and household productions,	96 00
" G. Manufactures,	244 00
" H. Fine arts, needle work, &c.,	328 00
" I. Flowers and fruits,	403 00
" K. Miscellaneous,	49 00
" L. Winter premiums of 1867,	242 00
Trials of speed for horses,	1,005 00
Total premiums, cash,	\$6,293 00
Medals and diplomas,	345 00
Total premiums,	\$6,638 00

The following table exhibits the number of entries in each division for the past ten years:

ENTRIES MADE BY EXHIBITORS FOR THE PAST TEN YEARS.

	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868
Cattle,	255	130	198	139	155	66	86	140	132	118
Horses,	342	274	217	185	252	227	269	263	269	220
Sheep, swine and poultry,	225	162	151	121	200	200	218	174	187	172
Implements,	221	166	180	173	208	207	259	227	479	428
Seeds & vegetables,	84	54	51	29	14	139	117	181	72	161
Dairy and household products,	94	87	107	67	78	149	122	156	110	107
Manufactures,	342	303	220	161	133	108	97	78	162	229
Fine arts,	194	170	104	128	167	197	278	232	283	220
Flowers and fruits,	515	333	222	281	256	76	231	308	169	246
Miscellaneous,	68	44	79	25	21	59	72	87	277	240
Crops, farms, orchards, &c.,	5	.....	3	3	1	2	18	14	16	17
	2340	1728	1538	1262	1485	1429	1797	1835	2106	2168

Though the annual exhibition was not as great a success, financially, as it has been in previous years, yet it will be seen that not only were the entries as large in number, but the Society distributed more premiums, and in larger amounts than in any year since the Society has been in operation. The time at which it was set, though well selected as not interfering with the exhibitions of the neighboring States, was unfortunate, with regard to operations in the field, as owing to the season, it happened when the farmers had the most favorable weather for sowing their winter wheat, and many who would have enjoyed the opportunities the Fair afforded, were imperatively obliged to stay at home.

In the divisions of horses, implements, and machinery, the exhibition of 1868 has never been excelled. In some of the other divisions the exhibition did not possess as high an interest as has been manifested at some of the fairs previously held. There were a larger number of exhibitors of long-wooled sheep from the Dominion of Canada than usual, and their entries attracted great attention, especially as there is prevalent a disposition to attempt the care and breeding of the long-wooled tribes, to a greater extent than for previous years. The call from the manufacturers for a supply of the finer kinds of long-wooled fleeces is very urgent, and the high prices paid for this variety of wool is generally drawing the attention of farmers to the advantages that may accrue. The variety of wool most in request, is that produced by the Leicester, or Bakewell breed. In its softness, gloss, and texture, it possesses qualities that are not possessed by any other wool. But, as yet, it has been found difficult to keep this stock up to the highest standard, from the fact that but few, if any breeders, devote themselves, in any of the States, to the breeding of stock solely for breeding purposes, as has been the case with the finer wools; and without such breeders, it is impossible to keep up a flock of any description of sheep.

The Society, by its premium list, has encouraged the breeding of the improved classes of cattle, to the full limit of their power, yet this State is still deficient in a general improvement in this important division of farm stock, and we are far from having as large a stock of cattle in proportion to our tillable lands, as there should be; and an examination of statistics would show that there are not as many cattle kept, in proportion to our population, and our pasture and tillable lands, as there were ten years ago. In horses there is a marked improvement. The standard of perfection is much higher, and it is now generally understood that mere speed, without size, and qualities that serve to render the animal one of general utility, is not desirable. It was the general impression that there never had been seen, at any State Fair, so large a number of young horses, possessing the best qualities to render the stock worthy of the reputation the State seeks to merit in this division of domestic ani-

mals. The fact that the production of pork products is hardly keeping pace with the increase of consumption, deserves the attention of the Society, and the very high prices obtained in all markets throughout the country, during the past three or four years, would seem to indicate that efforts should be made to encourage breeders to give more attention to this class. Within the past three months, I have received letters asking information as to where true and well-bred stock could be obtained. There is not enough attention given to the breeding of swine, and well-known experiments indicate that in none of the domestic animals is there a more quick return for care and intelligent selection in breeding.

The exhibition and trials of implements and machinery, though somewhat expensive, was very satisfactory, and proved immensely useful, as affording opportunity to introduce many inventions, and machines, that have been put at work in the State, and especially in the lumber regions.

The season was not favorable for the exhibition of fruit. The long drouth which prevailed during the summer affected the crop both in quantity and quality, but the exhibition was such as to attract a good attention, and to draw nearly all the premiums offered.

There has been but one farm entered for the premiums offered on farms, and that entry is by a member whose farm was examined in competition with others in 1866. No committee has been appointed to make any examination or report, as it was deemed advisable to await the disposition that the Executive Committee might make of the subject. Entries for the winter meeting have been made of tiled fields, of crops of corn, rye, potatoes, rutabagas, turnips, and seven entries of vineyards, and a statement of one orchard. On the vineyards a report is submitted by the committee appointed to examine them, Messrs. Adair and Waldorf, who visited the vineyards in October last.

Last autumn, about the time of sowing wheat, I received a letter from Messrs. Moore, Foote & Co., a well-known and long-established commercial firm of Detroit, in which I was informed that, for the purpose of aiding the Society in its efforts to promote the improvement of its agriculture, and especially in the culture of its most important grain products, they would place at its disposal five hundred dollars, to be awarded as three premiums for the best specimens of white wheat exhibited at the annual fair of 1869, as the crop of that year. The premiums were to be awarded under such rules and specifications as the Society might prescribe in furtherance of the design of the donors. By direction of the President, this very generous offer was accepted and acknowledged, and circulars containing the correspondence and the rules adopted for the government of exhibitors in this class, were circulated in every county of the State, whilst the conductors of the press gave the offer a very gen-

eral announcement. Up to this date, there have been made twenty-one entries, from eleven counties, and of these, six are from the county of Cass alone. It was hoped that entries of wheat would be made from every wheat-growing county in the State, as the inducements are the most liberal that have ever been placed before the farmers, to bring out their very best specimens of grain, and it is possible that if it were generally known that the time for making entries would be extended till the first of May, or June, there would be a larger number. The generous donation of Messrs. Moore, Foote & Co., which was tendered through F. Bagley, Esq., was designed to aid in keeping up the standard of the white wheat of the State, by making known through a general exhibition of the best of the crops, how high that standard is, and because so much of the real wealth of the State depends upon its production of the best varieties of wheat. Besides, it is a well known and acknowledged fact, that the farmer who can grow, for a series of years, the most wheat per acre, can also grow the largest crops of grass and fodder crops, and thus furnish the market with the greatest amount of the two ready-cash staples of bread and meat, is really the most successful of practical farmers. Every effort of this kind to encourage and raise the standard of our productions, is at the same time an attempt to elevate the system of agriculture adapted to Michigan, and to develop her resources and capacities and should receive the most hearty coöperation of this Society.

Among the specialties of the last State Fair, probably no part of the exhibition had a greater industrial interest than the display of the fabrics manufactured by the several woolen mills that are now in successful operation. The manufactures shown by the mills of Ypsilanti, Clinton, and Jonesville, were really viewed with great pride by the concourse of citizens who met there, and who became cognizant, for the first time, of the ability of Michigan to place such fine, serviceable woolen cloths and cassimeres in the market. The Society, in extending its classes for entries of this kind of goods, did a most serviceable work, and one that met with a hearty response from the manufacturers. There has been recently established within the State a manufactory of glass, a most important addition to the wealth of Michigan, and it is suggested that this manufacture is also worthy of the like facilities for recognition that has been extended to other manufactures.

R. F. JOHNSTONE,
Secretary.

TREASURER'S REPORT.

The Treasurer then submitted his annual report, which was as follows:

To the President and Executive Committee of the Michigan State Agricultural Society:

GENTLEMEN—The Treasurer herewith submits the annual report of the receipts and disbursements of his office for the year 1868:

Cash on hand January 1, 1868,.....	\$1,054 41
5-20 Bonds on hand,.....	3,000 00
Interest on Bonds,.....	165 30
Premiums on Bonds sold,.....	180 39
Receipts from Secretary on subscriptions, and from sale of tickets, etc.,.....	11,895 43
Total,	<u>\$16,295 53</u>

DISBURSEMENTS.

Premiums of 1867,.....	\$377 00
Premium checks for 1868,.....	5,742 00
Business checks of 1867,.....	90 30
Business checks of 1868,.....	8,368 45
Cash on hand,.....	717 78
5-20 Bonds on hand.....	1,000 00
Total,	<u>\$16,295 53</u>

On motion of Mr. Baxter, the report was accepted.

On motion of Mr. Baxter, a committee of three members was ordered to be appointed, to whom the address of the President was referred for the distribution of the subjects therein referred to.

Messrs. Baxter, Shoemaker and Phillips were appointed such committee.

On motion of Mr. Barker, the resolutions and proceedings of the committee on the protest relative to the award of a certain citizens' premium on trotting horses, was taken up and reconsidered.

The Secretary reported that in accordance with the request of both of the Executive Superintendents in charge of the Departments of Horses, Mr. K. C. Barker and Mr. W. S. Willcox,

the premium checks in this class were withheld, and that the question as to whether a pacing horse could compete under the rules and advertisements of the Society, had been submitted to what was recognized as the best authority on such subjects, in the following communication; and the answers received are appended to it:

At the State Fair recently held at Detroit, a premium was offered as follows: "4. For best buggy horse or mare driven by owner to buggy, a single dash of two miles; entry fee, \$10; no horse or mare to be entered in this section (No. 4) that is known, recognized, or has been used as a sporting horse; first premium, \$75; second premium, \$25." The rules adopted for the government of the entries read as follows: "Entries must be made with the Secretary on the afternoon and evening of Wednesday, the 16th of September, entrance fee to be paid at the time of entry. There must be at least three entries to each class, and the rules adopted for the government of each trial are those of the Detroit Association for the Improvement of Horses." Now, among the entries made there was a pacer, and before the race was started a protest against the entry of a pacing horse was made to the presiding judge, M. E. Crofoot, of Pontiac. The owner was informed by the judge that if his horse went in the race, it would be under protest as a pacer. The pacer came in first, and his owner claimed the premium on the grounds that the offer of the Society did not exclude him, and that a good buggy horse might be a pacer. The judges ruled the pacer out, but he appealed from their decision to the Executive Committee of the Society, where his appeal was sustained. Your opinion on this question is requested. Under the offer of the Society, was a pacer admissible? There were seven entries, and six of them were trotters, who would not have entered against a pacer. Was the ruling of the judges right? The rules of the Detroit Association being adopted for the government of this trial of speed, was not the decision of the judges of the race, carried on under the approval of the executive superintendents of the Society, final? Or had the Executive Committee the power to reverse the decisions made on the stand and concurred in by the superintendent placed in charge of that department? Another case of protest is against a mare that trotted in a race for "horses that had never made a mile at any horse fair or trotting match in less than three minutes." The claim of the protestant was that the mare had trotted in a trotting match in less time, although she was third in the match, but her time was taken unofficially of course. This is claimed as hindering her from entering. The judges decided that it was not a good reason or claim, and the protest was overruled. The pro-

testant appealed. Should the appeal be sustained? *Answer*.—1st. The decision of the judges was right. A buggy horse means a trotting horse. Races for pacers are expressly designated as for pacers. Suppose a man had brought in a running horse in a buggy, would the owner of the pacer have liked it? 2d. We have not the Detroit rules. Under all the rules that we ever saw, the decision of the judges has to be accepted as final. 3d. The mare had a right to start, as the outside time was of no consequence. Time must be made in a winning heat or a dead heat.

The above letter was addressed to *Wilkes' Spirit*, and the answer was received here as quoted above. The premium checks had not been filled out, in accordance with the notification received from the Superintendents, who claimed that in the previous action of the committee, the members had acted without having before them the full information necessary for a final decision.

On motion of Mr. Barker, it was

Resolved, That the Secretary be directed to issue the premium on the class referred to, to the parties to whom the awards were made by the judges of the race.

The President appointed the following committees:

On the Premium List—Messrs. Phillips, Scranton and Dean.

On Finances—Messrs. Willcox, Rising and Wakefield.

On Rules and Regulations—Messrs. Barker, Humphrey and Secretary.

Two reports from Mr. John Allen, of Plymouth, were read and discussed, but no awards were made.

Mr. Smith, of Clinton, submitted a verbal statement of a crop of six acres of turnips, from which he had raised 3,600 bushels.

A letter from Mr. P. D. Beckwith, of Cassopolis, was read, in which he offered the Society \$100, as a premium to be given to the best drill or grain sower; all drills to compete for any premium at any exhibition within the next three years, to be subjected to a test by a special committee appointed by the Executive Committee according to the following conditions: Each machine to sow two acres of heavy soil, and two acres of

light soil, on such farms as may be selected, for three years in succession, the said two acres of wheat to be harvested, threshed and weighed separate each year, and an accurate record kept of the seeding and harvesting. The committee are also to test each drill in actual work in sowing grass and clover seed.

The letter was referred to the committee on the premium list.

The report of the special committee on vineyards was read, as follows:

To the President and Executive Committee of the State Agricultural Society of the State of Michigan:

GENTLEMEN—We, a majority of the committee appointed to examine vineyards, entered for premiums, beg leave to report:

That we found the following entries and examined them in the following order, on the 22d day of October, 1888, this being after the grapes were all gathered.

J. M. Sterling's vineyard, Monroe, about 4 acres.

Hon. Joseph Weir & Bro.'s new vineyard, Monroe, about 5 acres.

Joseph Zedlaczeck's, about 4 acres.

John Resig's, partly in city and partly in town of Monroe, about five acres.

Messrs. Deidrich & Breisacher, wine merchants of Detroit, vineyards at Monroe of nearly 8 acres.

George Hurd's, on Sandy Creek, French Town, about 3 acres.

S. P. Williams, of Lima, Ind., vineyard near Hurd's, in French Town, 2 acres.

Pont de Peau Co., on a beautiful spot on the shore of Lake Erie, 8 miles from Monroe, 10 acres.

All of these vineyards we find in a fine state of cultivation, but as they were so fully reported last year, we don't feel it necessary to be lengthy now.

Your committee are fully satisfied, from the appearance of these vineyards, and the specimens of the [fruit and wine we were allowed to examine, that vine culture, in this section of the State, at least, is a success. The majority of the grapes grown in these vineyards are Concord and Delaware. The many other varieties are being tested.

We award the first premium to Pont de Peau, for having the best and largest bearing vineyard.

The second, to Messrs. Deidrich & Breisacher, for having the next best vineyard, with wine-mill and press attached. To these gentlemen, as

well as many others, much credit is due for their determination to fully test vine growing and wine making in Michigan, which is no longer considered an experiment.

WM. ADAIR,
F. WALDORF,

Committee.

The committee then adjourned to permit the several committees to consider the business before them.

TUESDAY AFTERNOON, January 26.

The Executive Committee met, the President being in the chair.

Mr. Shoemaker, from the special committee to which was referred the address of the President, and the reports of the Treasurer and Secretary, reported that the committee had had the several subjects referred to them under consideration, and recommend that so much of the President's address as relates to the finances, be referred to the committee on finance; that so much as relates to permanently locating a place for holding the State Fairs, be referred to a select committee of three; that the proposition of Moore, Foote & Co., be referred to the committee on premium list; that so much as relates to the encouragement of county and township clubs, be referred to the committee on conventions; that so much as relates to the State Agricultural College, be referred to the committee on the same; that the proposition that the members of the Executive Committee of this Society appear at the next annual fair, clad in garments of "Michigan manufacture throughout," be referred to the President, and that he be requested to take the necessary steps to secure a result so desirable.

The report was accepted and its recommendations adopted. Mr. Barker offered the following resolution:

Resolved, That W. J. Baxter be and is hereby appointed a committee to visit Lansing during the session of the Legislature, and memorialize that body for the re-payment of the

sums expended by the State Agricultural Society in the construction of the Normal School building, at Ypsilanti.

The resolution was adopted, and W. J. Baxter appointed such committee.

On motion of Mr. Baxter, the subject of the disposition of the reports on orchards and tile-drained fields, was reconsidered, and the question of the reports not being presented before the first of January, was deemed an objection, as a transgression of an important rule.

The Secretary, on behalf of the committee on rules and regulations, presented the following report, recommending a few slight changes in the rules of last year:

The committee recommend that the fifth rule, relative to admissions and entries, be amended so as to provide for sending to persons on viewing committees a copy of the proceedings of the Michigan State Board of Agriculture for the preceding year, if their name and post-office address is left with the Secretary. The fifteenth section is amended to provide that all exhibitors of thoroughbred, cross-blood, or half-bred animals will be required to file with the Secretary an authentic pedigree at the time of entry, and all exhibitors of native and fat cattle are required to hand to the chairman of the viewing committee a statement of the age and mode of keeping of said animals, which shall be published as a part of their report. The fourth rule, in relation to cattle and horses, is changed, so as to provide that all horses will be required to remain on the grounds during the days of exhibition, under penalty of forfeiture of right to compete, unless the exhibitor be permitted by the superintendent to take his horse off the grounds. A general rule is added under Division L—Winter Premiums—that all entries and reports under this head must be made to the Secretary, at his office, on or before the last day in December in each year, and that no premiums will be awarded unless three entries have been made in any class in which the entry is made.

The report was accepted, and the rules were adopted as recommended by the report.

Mr. Phillips, of the committee on the premium list, submitted the report of that committee, which was taken up in its order, and considered in committee of the whole.

In the Division of Cattle, no changes were made in the classes until the report reached Class 6, when the premium for the best bull of any breed or age was stricken out.

In the class for grades or native cattle, the premiums were increased so as to make the list read: "For best grade or native cow, four years old, \$20; 2d do., \$12. For the best heifer, three years old, \$15; 2d do., \$8. For the best heifer, two years old, \$10; best yearling heifer, \$8." The other premiums in the class to stand as they were in the list.

In Class 8 the premiums for the best trained yoke of steers is stricken out, and a premium is given to the trainer for the best exhibition of a trained yoke of oxen or steers, of \$10.

In Division B—Horses—the committee reported the list as unchanged in the class for thoroughbreds.

Mr. Willcox moved that the first premium in thoroughbreds be made \$100, which was not agreed to.

A motion was made that the premiums for the best thoroughbred stallion, five years or over, be made \$80; the second premium, \$40; and that for the best three-years old thoroughbred stallion, the premium be \$25; and the second be \$12.

This motion was adopted, and the premium list was changed in accordance therewith.

The committee moved that the title of the next class be made "half" thoroughbreds, instead of "part" thoroughbreds, and that the rule shall require that the stock competing in this class shall be bred on one side from a pure thoroughbred.

These motions were agreed to, and the last ordered to agree therewith.

Mr. J. M. Sterling, of Monroe, tendered to the President and Executive Committee an invitation to examine the wines

of Messrs. Deidrich & Breisacher, made by this firm from the grapes grown on the vineyards near Monroe during the past season, which was accepted, and the committee adjourned till half-past seven P. M.

The committee re-assembled at half-past seven, the President in the chair.

On motion, the further consideration of the premium list was postponed.

Mr. K. C. Barker, from the committee appointed at the last annual meeting to consider the subject of obtaining grounds near Detroit, and of making arrangements for the permanent location of the annual exhibitions, reported, verbally, that the committee had had the subject under consideration, and that the opinion of the committee was, that the interests of the Society would be much promoted if it possessed grounds of its own, where the Fair could be held from year to year. Jackson and Detroit were each central points, the most so in the State. If Detroit should be selected, it was ascertained, that if sufficient land could be obtained within a reasonable distance of the Michigan Central Railroad, that company would run a track to the ground, build a depot at it, and give the use of the track to other roads desiring to use it for the fair purposes. Mr. Barker also said that should Detroit be selected as the point at which the Society would locate its Fairs, that he would pledge the citizens as certain to raise funds sufficient to purchase the grounds and erect the buildings.

Mr. J. D. Adams, of Climax, Kalamazoo county, desired to have the fairs located at some one place permanently, with grounds fitted up in a proper manner. In his opinion, the proper place to locate it would be between Jackson and Kalamazoo, at some place where the railroad track could be run directly to it, and he would have no regard to placing it at or near the city. The fairs are for the benefit of the agricultural

community, and they should seek to have it established wherever it would be most convenient to this class. He would like to have a portion of ground somewhere, and have a law passed by the Legislature appropriating \$100,000 for the purpose of fitting it up, erecting buildings, adorning the grounds, etc.

Mr. Scranton, of Grand Rapids, thought the idea of Mr. Adams, of locating the grounds at a place without regard to any city, a very bad one, for there would be no accommodations for visitors. He thought Detroit was not sufficiently central, nor was Jackson. He thought that Grand Rapids was more central than either, but he doubted if the fair should be established permanently at any one place, and did not consider it would be profitable to keep it at any one place—that they would be more successful by changing to different points every year or two.

Mr. W. J. Baxter did not think the Society were prepared to locate at one point. Detroit, he thought, was as nearly central as any other city. We did not know where the central railroad points of the State were while so many railroads were being built, and just at present he thought it would be inexpedient to locate it.

Mr. Shoemaker, of Jackson, said if the committee desired to locate the fair at Jackson, the citizens of that city would give all the ground needed for that purpose. He, however, did not think it best to locate at any one point now, and it would be for the interest of the Society not to locate permanently. If located, the fairs would become mere local exhibitions, and would be devoid of general interest. He, however, believed it would be wise to hold the fairs for the next few years at some central point, and would be glad to have it at Jackson. As to establishing it permanently, he could not believe that at the present time it was expedient. As this matter was alluded to in the President's address, and referred to a special committee, he thought that the old committee should be discharged, and the matter given into the hands of the new committee.

Mr. Gilbert, one of the members of the committee, desired

to have it referred to the new committee. The committee had no instructions on the matter, and found it difficult to obtain the price of land, and other information required. He said there was a dissatisfaction on the part of many as to having the fair located at Detroit, especially among citizens of the interior, and if it was to be permanently, he desired to see it at some other point than at Detroit.

Mr. Shoemaker, in order to get at the sense of the committee relative to the permanent location of the Fair, moved that the matter be indefinitely postponed. The motion was not seconded.

Mr. Dean, of Adrian, suggested that grounds be rented at two or three places in different portions of the State, where the necessary buildings shall be erected, and that the Fair shall be held alternately at these places.

Mr. C. W. Green, of Farmington, desired to see the jealousy of different sections of the State wiped away. The people of his vicinity were in favor of locating the Fair permanently, and the reason they give for doing so was the very reason why he did not want to locate it. They say locate it and let it be at Detroit, because Detroit is convenient to them. So it is with every section of the State; each desires to have it located at some point convenient to themselves.

The Fairs are generally attended principally by those living within forty miles distant from the place it is held, and for this reason he thought it should be held at different points every year, if possible, and at wherever—city or village—the best inducements are offered.

The Secretary said that there were several considerations which rendered it advisable that the Executive Committee should not act hastily upon this subject, as in it was involved, to a great degree, not only the usefulness, but the life of the Society. One point had not been touched upon at all in this discussion, and he would mention it before proceeding any further, as it might be forgotten, and that was the question as to whether the Executive Committee had the power to pin down

for all time, or even for a long or short term of years the State Agricultural Society to a single location for the Fair, whether it did well or ill, or whether it was profitable or unprofitable. He did not think the committee could do that. Nor if it could, did he think it a policy that would be sustained by the agricultural community of the State for any great length of time. It was a policy that had been tried very fully in this State, and to some extent in other States, and it had not been found satisfactory, either as beneficial to exhibitors, or as financially successful to the Society. He did not understand that there was any proposition to locate the Fair permanently. He thought that the general understanding was, when this matter was spoken of last year, that as Detroit was the commercial centre of the State, more easily reached by railroad connections from the various sections of the State than any other point, and as the Fair held there would accommodate a larger mass of people from a greater extent of country, and, especially, be more apt to attract a greater number of exhibitors and visitors from abroad, it was altogether likely, taking a series of years, that the annual fair of the Society would necessarily be held oftener during such series of years at Detroit, than at any other one point. Hence, that would be a matter of very great advantage to the Society in the way of economy, if it had a ground that it could call its own; where, instead of having all its improvements destroyed at the end of each lease, it could, on the contrary, leave its structures and improvements standing, so that they could be added to from time to time as the progress of the Society might require. There was every reason to believe as the State became filled up with an intelligent population, the Society, in obedience to the principle of promoting the improvement of agriculture, would bring its annual exhibitions more and more within the reach of the community it desired to benefit by its organization, and this could be done only by taking it into the rural districts, and not confining it to a mere routine of city life year after year. The Secretary thought that each expenditure of the Society for construction should

be used to build up some structure for its future use, wherever it might be located, to which it could again resort as the time came round, when it should repeat its visits to the section of the State where it might be deemed most advisable to hold its exhibitions. Every ten years it would seem there came into action a new generation, who took part in public festivals like this with great fervor, because they were new to them, and were, consequently, regarded with interest. There was, therefore, little doubt about the exhibition being sustained. The question was to so arrange the affairs of the Society that its necessary expenditures, instead of being totally lost, would at least in part be so invested that the Society would reap some benefit from them in the future. Nothing would do this more than to secure such grounds either by lease, gift, or purchase, as has been suggested by the committee, and then place upon it from time to time the buildings and fixtures required, at such points in the State as experience had shown were best adapted to accommodate the requirements of the people for a State Fair. The proper place to begin with a system like this, and which was similar to that of Canada, was, unquestionably, Detroit, and whilst he cheerfully sustained any movement that would lead to the procuring of permanent possession of land useful for the Society, he desired that it should not enter into engagements which it would be impossible for it to perform, and which, even if it could, would eventually be detrimental to its usefulness and future prosperity. It was a matter that might be referred back to the committee for further consideration.

On motion of Mr. Shoemaker, the committee was discharged from the further consideration of the subject, and the report was accepted and laid on the table.

On motion of Mr. Baxter,

Resolved, That the business committee be and it is hereby authorized to establish the State Fair for 1869 at such place as will best subserve the interests of the Society.

The committee, on motion of Mr. Baxter, again took up the

consideration of the reports on orchards and draining, and discussed them.

On motion of Mr. Phillips, the committee reconsidered its action on the premium list on the division of cattle.

Mr. Phillips then moved that the premium on Short-horn herds, which had been made \$50, be now made \$100, which was agreed to.

The committee then adjourned till Wednesday morning, at 9 o'clock.

WEDNESDAY, 9 o'clock A. M.

The committee met, the President being in the chair.

The committee proceeded to the further consideration of the report of the committee on the premium list.

In Division B, the class for draught horses was ordered to be made to read the same as the list for "horses of all work."

A motion was made to strike out the class of saddle horses, which prevailed, but was afterwards reconsidered, and the class was retained.

In Division C—sheep—the class for Southdowns was ordered to read for "Southdown, Shropshire, and other middle-wooled sheep."

In Division D, it was recommended that all premiums now on the list for mowers and reapers be stricken out, while to exhibitors in this class every facility should be given for exhibition, as no trial could be made at the season of the fair, and no intelligent decision or award could be made.

In this division, also, farm wagons, sleighs, and ox-carts were removed to the class of "barn-yard articles."

In Division F, it was ordered that a class of premiums for home-made wines should be added to the class containing the list of wines, viz:

For best half gallon of wine, made from each of the grapes

known as the Catawba, Concord, and Delaware, a premium of \$5 00, and for second, of \$2 00.

In Division G, the Secretary was directed to place the weight of the heavy woolen cloths at the amount best adapted to bring out the goods made by the manufacturers.

In Division K, premiums were offered for specimens of manufactured iron and glass, made in the State.

Mr. Baxter moved that a first, second, and third premium be offered on velocipedes, but the motion was modified, and became the following resolution, which was adopted:

Resolved, That the premiums on velocipedes be referred to the business committee, with power to make such arrangements for a class of premiums as it may deem for the best interests of the fair.

In Division L—winter premiums—the rule requiring three entries for each premium before any shall be awarded, was stricken out.

On motion, the time for the entries to be made for the premiums on wheat, offered by Moore, Foote & Co., was extended to May 1, 1869.

On motion, the list of premiums on sorghum and sorghum machinery, was stricken out of the list.

Mr. E. N. Willcox, from the committee on finance, made the following report:

The finance committee report that the account of the Treasurer, which has been referred to them, has been found correct, and all its items properly vouched for. There seems to be a need, however, of some means of cancellation by which all possibility of the second presentation or payment of a warrant can be prevented. The destruction of the warrants by your body has been suggested, but in many cases the endorsement of the payee is the only voucher for the account upon which the warrant was issued. Some other mode would seem to be preferable. We would recommend that the Secretary, in future, require, in every case where practicable, a receipted bill for every sum disbursed, or check issued, and then, at the annual busi-

ness meetings, after examination of the accounts, the warrants can be burned. It appears that the number and amount of the drafts drawn on the Treasurer, remaining unpaid, have not been ascertained for this year, nor, as we have been informed by the Secretary, for several years preceding. It is difficult, therefore, to know precisely how much of the balance of cash reported on hand is subject to call on such outstanding warrants, and to know the precise sum of your actual cash resources. Your committee recommend that it be referred to the proper officers to ascertain at the earliest convenience, and report the numbers and amounts of all the outstanding orders on the treasury, and that a list of such be reported at the annual business meetings hereafter, with the Treasurer's accounts.

The report was accepted and adopted.

On motion of Mr. Barker, the committee proceeded to the appointment of the viewing committees.

Mr. Barker moved that the Viewing Committees be appointed on the grounds by the Executive Committee at the time of the annual Fairs, which was not adopted.

Mr. Baxter moved the adoption of the following resolution:

Resolved, That each member of the Executive Committee be requested within twenty days from this date to transmit to the Secretary and chairman of the Business Committee the name of one person whom he deems suitable for each Viewing Committee, and that from the lists of names so furnished, the President, Secretary, Treasurer and Chairman of the Business Committee, shall be a committee to appoint the Viewing Committees; and that the persons so appointed be properly notified by the Secretary, but that their names be not published in the premium list.

Mr. Shoemaker called for a division on the question of publishing the names, which was agreed to.

The question then recurred on the adoption of the resolution designating the method by which the Viewing Committees should be chosen, and it was agreed to.

The question was put on as much of the above resolution as referred to the publication of the names of the committees, and it was not adopted.

Mr. Scranton, from the committee on Conventions, reported, verbally, that it recommended that a convention be held at such place as may seem most advisable to the committee, during the present winter.

Mr. Green, of Farmington, stated that at a recent meeting of the Oakland Agricultural Society the proposition of an Agricultural Convention was brought up, and a committee of three were appointed to confer with a committee of the Executive Committee of the State Agricultural Society relative to holding such convention at Pontiac. He therefore suggested the appointment of a committee to confer with the Oakland county committee in reference to this subject. The matter was referred back to the committee on Conventions, with power to call a convention under the auspices of the State Agricultural Society, at such time and place as in their judgment is deemed best.

Mr. Baxter offered the following preamble and resolution:

Whereas, It appears by the report of the committee on permanent location of the Fair, that Mr. James F. Joy, as an individual and as representative of the Michigan Central Railroad Company, has made a most liberal offer relative to furnishing grounds, tracks, depots and railroad facilities, and other citizens of Detroit have offered to contribute funds to such an amount, that if established at or near Detroit, the Society would have been put in possession of ample grounds and facilities for the permanent holding of Fairs, without extra cost to the Society; therefore,

Resolved, That while it is not deemed advisable at the present time to permanently establish grounds for the Fairs at any place, the thanks of this Society are hereby extended to Mr. James F. Joy, as an individual, and as representative of the Michigan Central Railroad Company, and to the citizens of Detroit for their most liberal offers.

On motion of Mr. Baxter, the matter as to whether an address should be delivered at the next Fair was left to the President.

Mr. Gilbert offered the following resolution, which was adopted:

Resolved, That as part of the class on herds, there shall be offered a premium of \$50 for the best cow, with such number of her progeny, of any age, not less than three, as the exhibitor may elect to show with her.

On motion of Mr. Baxter,

Resolved, That the thanks of the Executive Committee are hereby tendered to A. B. Taber, Esq., the gentlemanly proprietor of the Biddle House, for the excellent accommodations furnished in which to hold its meetings.

Resolved, That the thanks of the Executive Committee are due and are hereby tendered to the reporters for the daily *Tribune*, *Free Press*, and *Post*, for their excellent reports.

Resolved, That the next annual fair shall be held on Tuesday, Wednesday, Thursday, and Friday, September 21, 22, 23, and 24, 1869.

On motion of Mr. Willcox, the premium list was reconsidered, and the class of saddle horses was ordered to be reinstated, with the premiums at \$15 and \$10.

On motion, the President was authorized to be delegate to represent the Society at the American Pomological convention, to be held in Philadelphia.

The President announced the following appointments:

Business Committee—John Gilbert, Ypsilanti; W. J. Baxter, Jonesville, and M. Shoemaker, Jackson.

EXECUTIVE SUPERINTENDENTS.

On Cattle—G. W. Phillips, Romeo; M. Miles, Lansing.

On Horses—K. C. Barker, Detroit; A. J. Dean, Adrian.

On Floral Hall—M. E. Crofoot, Pontiac; M. Shoemaker, Jackson.

On Mechanics' Hall—S. B. Wakefield, Monroe.

On Agricultural Hall—E. N. Willcox, Detroit.

On Manufacturers' Hall—L. S. Scranton, Grand Rapids.

On Implements and their Trials—E. W. Rising, Richfield.

On Fruits—Wm. Adair, Detroit.

On Police—J. A. Walter, Kalamazoo.

Chief Marshal—C. W. Green, Farmington.

The committee then adjourned *sine die*.

BARRY COUNTY.

The Secretary of the Barry County Agricultural Society, J. M. Nevins, states that the Annual Exhibition of the Society was held on the 6th, 7th and 8th of October. The 7th was very rainy, and crowded the examinations and most of the business of the show into the 8th, or last day, much reducing the pecuniary receipts. The number of members was 300, and the number of entries 425. The premiums offered amounted to nearly \$500, and those awarded to \$219 50.

The following is the financial exhibit for the fiscal year ending Dec. 20, 1868:

RECEIPTS.

1867.

Dec. 20. To amount cash on hand,..... \$294 40

1868.

June 23. To receipts for lease of grounds,..... 18 00

Aug. 27. " " " " 24 00

Oct. 20. " donation of A. Ryerson, (premium)... 5 50

" 6, 7, 8. " receipts for membership,..... 300 00

" 6, 7, 8. " " gate fees and rents,..... 145 05

" 6, 7, 8. " " lumber sold,..... 1 87

Nov. 2. " amount voted by county, (anticipated) 100 00

\$888 32

EXPENDITURES.

1867.			
Dec. 31.	By paid premiums to date,.....	\$24 50	
1868.			
June —.	“ “ express charges on State Reports,	4 07	
Sept. & Oct.	By paid cost of new hall,.....	669 34	
Oct. 8.	“ “ fitting grounds, and expense of Fair,.....	96 62	
“ 12.	“ “ for printing,.....	56 00	
Dec. 20.	“ “ premiums to date,.....	206 88	
“ 20.	“ “ loss in mutilated currency,....	71	
“ 20.	“ “ building committee,.....	15 00	
“ 20.	“ “ Secretary's services,.....	25 00	
			<u>\$1,098 12</u>
	Indebtedness of Society,.....		<u>\$209 80</u>

Officers for 1869.—J. C. Bray, President; J. M. Nevins, Secretary; D. G. Robinson, Treasurer; T. Altoft, C. B. Benham, J. C. Hanna, Gilbert Striker, Wm. P. Bristol, Directors.

BAY COUNTY.

The Secretary of the Bay County Agricultural Society, W. H. Fennell, states that this Society has, in a good degree, recovered from the depressed condition in which it was placed at the beginning of the year 1868, when it had only \$24 in its treasury. The liberality of Jas. J. McCormick has placed the Association on a firm footing for the next five years,—the rental of buildings and grounds to be \$50 a year. The main building, as fine as any similar one in any county in the State, is in the form of a cross, 75x89 feet, on high and dry ground, very conveniently located on the line of the street railway.

The Annual Exhibition of the Society was held on the 6th to 9th of October, and the weather being very rainy, it was not, financially, a success. The total receipts from all sources were \$624. Disbursements, including rent, printing, &c., \$474. Pre-

minums (not all paid) will consume the balance. The number of members of the Society is 309; the total number of entries was 502. For the premium on cultivated farms of 40 acres, John Obermiller made the only entry. He has a good farm, well cultivated, properly stocked, and a good orchard and buildings.

In cattle of distinct breeds, Hon. James Birney exhibited a fine herd of Devons. Some good milch cows and working oxen were shown. Some very good horses, both of the class adapted to light carriages and those suited to heavier work, were exhibited. Our lands are not as yet adapted to sheep-keeping, and only two sheep were exhibited. The vegetable department was well filled, and that of fruits was highly creditable—the specimens of apples, pears, and peaches, being very fine. The soil and climate are evidently favorable to fruits, and the Saginaw Valley furnishes an excellent market for all kinds. Some good samples of grain were shown, but the competition was light. The ladies' department was well filled with excellent specimens of such articles as are usually exhibited on such occasions.

Farming in this section has hitherto been much neglected, but people are awakening to the fact that *good farming pays*. There is always a good market here for all produce, at remunerative prices. By the latest statistical returns, the population of our county is 15,100.

BERRIEN COUNTY.

The Secretary of the Berrien County Agricultural Society, J. B. Fitzgerald, states: "During the year, the Society has been re-organized and incorporated under the provisions of the general statute of the State. The sale of the old Exhibition Ground, and the purchase of a new one, too late in the season for suitable preparation, led to an arrangement for holding the Annual Exhibition on the grounds of the Park Association, at

the village of Buchanan, by which arrangement that Association received all the proceeds, and paid all the premiums awarded, and other expenses incurred; so that the financial results are not fully within my knowledge, but I am told that they were entirely satisfactory to those interested. The most commendable zeal and enterprise were manifested by the Park Association and people of Buchanan to make the exhibition successful, but a severe storm, which prevailed during the first two days, prevented any unusual display.

"In revising the Premium List, several changes were made. The premiums upon horses, cattle, hogs, sheep, and fruit, were considerably increased; many unimportant articles were omitted from the several classes, and the beneficial results of these changes were plainly apparent.

"The new Exhibition Ground contains twenty-five acres, and is most eligibly situated within the city of Niles. It is already substantially fenced, has a superior half-mile track, spacious amphitheatre, and a floral hall. Other buildings are designed to be built, combining convenience and architectural taste. It is intended that the next annual exhibition shall be a decided success, and the Society be placed in the way of permanent prosperity and usefulness."

Officers for 1869.—William Bort, President; Charles Clark, Vice-President; J. B. Fitzgerald, Secretary; John D. Ross, Treasurer; with a Board of ten Directors.

BRANCH COUNTY.

The Fifteenth Annual Exhibition of the Branch County Agricultural Society was held on the Society's grounds, in Coldwater, September 23d to 25th. Notwithstanding the unfavorableness of the weather, the exhibition appears to have been a very good one. It appears from the list of premiums awarded, that Ayrshire and "polled or hornless" cattle have been intro-

duced into the county, but of what particular breed the hornless cattle are, is not stated.

Officers for 1869.—James Clizbe, President; Jonathan H. Culver, and twelve others, Vice-Presidents; Lucius Phetteplace, Secretary; George W. Vanakin, Treasurer; with a Board of six Directors.

CENTRAL MICHIGAN AGRICULTURAL SOCIETY.

This Association, embracing the counties of Ingham, Eaton, Livingston, Shiawassee, and Clinton, is steadily gaining in strength and influence. Its Third Annual Exhibition was held on the Society's grounds, in Lansing, on the last day of September and first two days of October. Notwithstanding the misfortune of unfavorable weather, which had been experienced at both previous exhibitions, the general display was very respectable, and, on the whole, encouraging in reference to the future. The entire receipts of the Society for the year were \$6,176 21, and the disbursements were \$6,031 27. The Society is still considerably in debt on the purchase of its grounds, which, however, are very valuable.

Officers for 1869.—A. N. Hart, President; N. B. Jones, Secretary; F. M. Cowles, Treasurer; with an Executive Board, consisting of one member from each of the five counties embraced in the Society.

EATON COUNTY.

The Secretary of the Eaton County Agricultural Society, T. D. Green, of Charlotte, states that at the last Annual Exhibition of the Society, held at Charlotte on the 30th of September and 1st, 2d, and 3d days of October, the weather was rainy for

the first two days, which was the reason of the exhibition being made to include four days instead of three, as originally intended. The number of entries was 1,400, and the premiums paid, amounted to \$573. An address of a practical character, was delivered by the Hon. H. A. Shaw. The Society is incommoded by the limited extent of its grounds, which are within the corporate limits of the town of Charlotte. The land is considered too valuable to be used for such a purpose, and the Society has decided to sell it, and purchase 25 to 30 acres elsewhere.

Officers for 1869.—E. Shepherd, President; T. D. Green, Secretary; E. A. Foote, Treasurer.

GENESEE COUNTY.

The Executive Committee of the Genesee County Agricultural Society, in submitting their Nineteenth Annual Report, state that the Society continues in a prosperous condition, and that the season of 1868 was generably favorable for crops and farming operations, with the exception of the unprecedented hot and dry weather of July, and even that was serviceable in bringing the wheat crop rapidly to maturity, and causing it to be saved in fine condition. The Committee submit the following summary in regard to the products of the year:

FIELD CROPS.

Wheat.—Several reasons operated to induce farmers to sow more land than customary with wheat, viz: The high price ruling for that grain; the cessation of the ravages of the midge; and the depression in wool causing farmers to part with their sheep. The combined operation of these circumstances caused at least fifty per cent. more land to be devoted in the fall of 1867 to winter wheat, than was sown in 1866—being full twenty-five $\frac{1}{2}$ cent. over the average of ground usually assigned to

this crop. The same proportions would hold good as to spring wheat also. The yield was above the general average of seasons, and amounted, in our estimation, to twenty bushels to the acre on the average throughout the county. The quality was good.

Oats.—About the average quantity of land was sown with oats, and the yield an average crop—say forty bushels to the acre, of fair quality.

Indian Corn.—Of corn, about the usual quantity also was planted, yielding an average crop of about forty bushels to the acre. The land was in good condition for getting in the seed, and the season was favorable throughout for its growth. The quality was generally excellent.

Barley yielded an average crop per acre, but less land was sown with this grain than usual. The produce was about twenty bushels to the acre.

Hay.—We should say that one-fourth less meadow surface was mown last season, than has been customary in this county. This may be ascribed partly to clover seed failing to germinate, owing to the dry weather; and partly to the unusual breadth of land assigned to wheat. The yield $\frac{3}{4}$ acre, however, was a full average, or one and a quarter ton; and it was saved in fine order. We may add here the same remark made in our last Annual Report, that an extensive export demand keeping up the price has caused many farmers to believe it more profitable to dispose of their hay, than to winter their stock upon it, and has been one main cause, doubtless, why so many sheep have been butchered.

Of *Potatoes*, about fifty per cent. more were planted in 1868 than in the previous year. The yield was somewhat under an average—say eighty bushels $\frac{3}{4}$ acre, and the quality good. No rot has visited the potatoe in this county since 1866.

Hops, which in 1867 were almost destroyed by the ravages of the insects, yielded a fair return in 1868, and generally of excellent quality. Unfortunately, however, the growers have found no market for them; the prices at the centres of consumption ruling so low, as to be entirely unremunerative.

FRUIT.

Cultivated fruit of all kinds, excepting *Grapes*, proved very deficient in quantity. Fine grapes were plenty, and the attention bestowed upon their cultivation seems to exhibit no diminution of interest.

CATTLE.

Our remarks of last year, upon stock, will apply very generally to the present. The continuation of the renewed interest in improved cattle is very gratifying. Since our last report, choice Durham and Devon stock of the best and purest bloods the country affords, have been selected with much care and judgment, and introduced into the county by Gov. Crapo, Messrs. Dewey and Beahan, and Henry Schram. Gov. Crapo has also introduced the first full-blood Herefords which have appeared among our stock.

HORSES.

No less attention is bestowed upon horses. Light horses, however, do not maintain their value, so far as market price is concerned, in comparison with heavy draught horses. The preference of farmers seems to be steadily growing towards the latter, as the most serviceable for general farm work. A new feature of the fair this year, was the offer of premiums for the best walking horses, and it awakened quite an interest, many of our practical men deeming the horse's walk the most important gait to cultivate and develop. Premiums for Jacks and Mules were likewise offered for the first time at this fair, but the entries were not numerous.

SHEEP.

The Sheep Breeders' and Wool Growers' Association of this county express so nearly our views on this important interest, that we quote as follows from their Annual Report for 1868:

Wm. A. Morrison, Esq., of the city of Flint, has favored us with the following statement:

The total amount of wool marketed at this place for the past season, 1868, is 555,000 pounds, the items which go to make up this amount being gathered directly from the buyers. This, however, includes 50,000 pounds which will be used at the mill of Messrs. Stone & Willard.

It has brought the farmers an average of 38 to 40 cents, for best, though much that was not in good condition has been sold at a proportionately lower rate. The general condition of wool has been fair to good, and increasing pains have been taken on the part of many farmers to bring to market their lots in a well washed and well handled condition, that will compare favorably with wool from other parts of the State; and great credit is due for these things. All that is needed is a persistent effort to continue in this line, and to have it general. The standard will then be raised to a point which will certainly tell well for the credit of Genesee county farmers.

A new feature in the raising of wool is now beginning to develop itself, and wool that a few years since was only a discouragement to raise, is now and will be for a long future in good demand, and is certain to bear a good price. I refer to the full and half-blooded Leicester and other long combing wools, the value of which depends in a great measure on their length, strength and lustre. Mills have been erected and machinery prepared in Eastern States, especially for this class of wool; and it is thought by many of our farmers in some sections of the country to be the most profitable of any. The preference is also given to such breeds of sheep for supplying the great demand for fine mutton which is certain to follow their introduction; and certainly something of this kind, by way of a substitute, must be furnished soon; for the astonishing destruction that is now being carried on among the flocks of Merino sheep will require at the hands of breeders something to compensate for the present waste. Manufacturers have to scour the world for a supply of this long wool, and it might just as well be supplied at home.

It has been suggested by those familiar with the subject, that the time is soon to come when those who hold on to their flocks will be the gainers; and it looks very plausible. "A word to the wise is sufficient."

SWINE.

Of hogs, the quality is excellent, though the supply is not so full as it was a year ago. While many other breeds have their admirers and advocates, the Chester-White blood seems to maintain the preference it had already acquired.

MANUFACTURES.

Manufactures were never before in so prosperous a condition in Genesee county. New mills, new factories, new foundries, and new machine shops are springing up; while older ones are increasing their powers, and extending into fresh branches of business. It is also observable, that in the new manufacturing enterprises, the appliances are first-class in character. No second-rate structures, machinery, or productions seem to satisfy the operators; but the latest improvements and the newest inventions are sought after and employed.

The Annual Exhibition was fixed for the last two days of September and the first day of October, but in consequence of rain on the second day, the exhibition was extended to the 2d day of October, and proved in all respects successful. The attendance was very large, and the number of entries considerably greater than at any previous exhibition of the Society. The total receipts of the exhibition were \$2,007 50. The address was delivered by R. F. Johnstone, Secretary of the Michigan State Agricultural Society.

Officers for 1869.—E. W. Rising, President; F. H. Rankin, Secretary; Oren Stone, Treasurer; with an Executive Committee consisting of seven members.

SHEEP-BREEDERS' AND WOOL-GROWERS' ASSOCIATION.

The Executive Committee of this Association submit an Annual Report, from which the following extracts are taken:

There has been no return of the fatal epidemic which decimated so many flocks in the spring of 1867. On the contrary, sheep have been quite healthy, wintered well, and exhibited a good condition throughout the year. The demand for wool at what seemed high figures two or three years back, having induced farmers to enter very extensively into the breeding of sheep, a corresponding reaction took place when the depression in the wool trade, which followed, took place; and the slaughter of large numbers referred to by us at the last annual meeting, has been continued through the past year. So extensively has this been carried on, that we should estimate a diminution in the number of sheep now in this county, of full twenty per cent. from the number held at this period last year. The same desire on the part of farmers not to let their flocks increase, caused fewer lambs to be raised than usual, so that the natural increase has been less than would have been exhibited under other circumstances. Notwithstanding all this, we see no reason to change the opinion we expressed last year: "We cannot but think that some of those farmers who have been in such haste to get rid of their flocks for any nominal price they would bring, will yet see reason to regret their precipitancy." Such panics feed themselves. Where almost every one wants to sell, there are few or no buyers; and prices work down correspondingly. When this depression has been accomplished, the owner begins to think that his sheep are not worth what it will cost to winter them, and he becomes more than ever ready to sacrifice them. Finding fodder bringing a good price, he is soon prepared to accept for his sheep whatever he can get, and another downward step in the progress of depreciation ensues, until, in fact, some farmers would rather give away their sheep, if that were necessary, than keep them, forgetting for the time what he must see upon reflection, that such practice cannot be persisted in without ruinous effects. As well might a capitalist live upon the expenditure of his principal, instead of augmenting by making it reproductive, as that a farmer—because for-

tuitous circumstances have made the fodder seem worth more than the animal—should rid himself of his stock, that he may be at liberty to sell his hay. If no return be made to feed and maintain the strength of the original source of supply, exhaustion is inevitable, sooner or later, in either case.

Notwithstanding this disposition on the part of so many to get rid of their sheep, we are pleased to observe that others—more far-seeing, as we believe—still manifest their faith in the ultimate profit of sheep-husbandry, by the continued importation to the county, from abroad, of additional Leicester, South-down, and Cotswold sheep, of the best bloods.

The average price of wool the past season was about ten per cent. below that of 1867. It is conceded, however, by the buyers, that the quality and condition of the clip of 1868, was superior to that of the previous year; and that a marked improvement in its handling was manifest. A continuation of effort in this direction will undoubtedly bring its reward in time, both in reputation for the county, and in money for the wool.

* * * * *

The usual preparations were made for a Sheep-Shearing Festival to be held on the 13th and 14th of May; but as it rained continuously during both days, and the weather was otherwise very inclement, nothing was done in the way of shearing, and consequently no premiums awarded, although many fine sheep were brought in.

Believing that bottom has been reached in the value of sheep, and that the tendency will henceforward be upwards, we would once more reiterate our confidence that despite such “panics” as we have experienced for the past two years, there is no branch of the farmer’s business more deserving of his care, than *prudent* attention to sheep-breeding and wool-growing.

For the Executive Committee.

F. H. RANKIN,

Secretary.

FLINT, December 31, 1868.

Officers of the Association for 1869.—Chas. Pettis, President; F. H. Rankin, Secretary; O. Stone, Treasurer; with an Executive Committee consisting of seven members.

HILLSDALE COUNTY.

In reference to the Hillsdale County Agricultural Society, the President, Goodwin Howard, and Secretary, F. M. Holloway, transmit the following:

In presenting the Annual Report of the Hillsdale County Agricultural Society for the year 1868, we are under the necessity of making an apology for the barrenness of our products from the same causes that operated against us the last year, viz.: excessive heat and drought at a time when they were least able to withstand it. In examining the reports of the different county societies for a period of years, we find no definite plan followed in making them up, or in giving information by which you can trace progress with any, they being generally the productions of different minds and management from year to year.

It would seem that more system should be had, and information obtained, through these reports. It is no great thing to advertise a Fair, get up flaming show-bills announcing some fast trotting or running, draw a crowd, get large receipts, and from these report the Fair a "perfect success." But the question arises, how far do such Fairs advance the agricultural interests of the county? From such a report, how can any one tell whether the organization is accomplishing a good work among the people or not? How tell which of all the county organizations in the State comes nearest to accomplishing the design for which it was created? If the law authorizing these societies does not already provide, it should be so amended as to enable the Secretary of the State Board to furnish blanks, with appropriate headings, to each Society, by which information could be obtained from each, showing the condition and

amount of crops; condition of live stock, kinds and extent of manufactures, experiments with manures, progress in fruit culture, with the kinds adapted to the several localities, together with such other facts as tend to show the efficiency of the several organizations.

In the absence of what we deem a great desideratum, we give you a statement of the crops, stock, fruit, and manufactures, as gleaned from observation, and confirmed by our Annual Exhibition in October.

Cattle.—The prevailing breeds of the county are the Short-horns and Devons, with their crosses on the native. Progress is being made with the Short-horns; they have been disseminated largely in the past year; some very fine specimens have been introduced, and our best stock men are more than ever awake to this important branch of agriculture.

Horses.—A steady improvement on the Black-Hawk, Messenger and Duroc strains, a class that have proved well adapted to our wants, is the only noticeable feature we have to report.

Sheep.—In this class of husbandry our farmers are feeling very blue. Their investments have been heavy; the last clip fell far short in price from what they anticipated, short of what they had reason to expect from the anticipated operation of the Tariff. As a result, many have slaughtered their entire flocks; all have reduced largely; the decrease for '68 from the previous year was full 20 per cent.; for the coming year it will reach nearly 40 per cent.

Swine.—Of hogs, the county has a fair supply. The Chester-White, and a cross of these on the Byfield and Suffolk, prevail. The Essex were introduced in the county some 12 years since, but from an effort to cross them on the larger breeds, a failure was made, and the popular mind came very near condemning them, but the pioneers in the enterprise held out with faith, went to breeding them pure from selected stock, and the result shows a very fine hog, of good size, hardy, with fine-grained meat, docile, and easily-fatted at any age. The demand for breeding purposes, this fall, has been much above the supply.

Poultry.—Much has been said as to the merits and demerits of this and that class of Poultry, and the *chicken fever* has run so high at times that it has *incubated*, and produced so many varieties of the pigmy class that one is at a loss whether to admire or pronounce all a humbug. There are, and always will be, those who admire *fine feathers*, but the utilitarian seeks profit from all with which he has to do. We find the larger breeds, such as the Brahmas, Polands, Dorkings, Spanish and Bolton Grays, occupying most of the *henneries* of the county. From a careful estimate, it is found that the returns of the county from eggs and poultry, amount to more than \$20,000 a year.

Manufactures.—Under this head we will introduce the Cheese Manufactories of the county, mention of which was made in our last report. The Reading Factory, owned by Messrs. Fowler, Kinne & Co., has been operating on a fourth of its capacity the past season, turning out about 1,000 lbs. per day. We learn from those interested that it has been in all particulars a success, and will be largely increased the coming season. The Allen Factory, owned and operated by S. Webster, Esq., is on a smaller scale. We have no means at hand for ascertaining its capacity.

The Jonesville Woolen Factory has become a fixed institution, employing about 50 operatives, and running on full time the year round. With its wide reputation, its fabrics are taken as fast as finished. Our other manufactories are on a smaller scale, but sufficiently large to give employment to a large number of artisans in the several villages of the county.

Crops.—Of *Hay*, the crop was very fair in quality, the yield being about $1\frac{1}{2}$ ton per acre. *Wheat* and *Oats* were injured in filling and ripening, by the excessive hot weather. The average yield of wheat was about 15 bushels per acre; oats about 30 bushels, and very light. *Corn* was materially injured by drought, giving but little over half a crop, probably 50 bushels of ears to the acre. *Potatoes* matured very late from the same

cause. Yield, about 100 bushels per acre. *Buckwheat* very fair, about 30 bushels per acre.

FRUIT, for which our county is noted, was almost a failure; it set well in the spring, but the cold rains of May and June blasted most of the apples. A few peaches, pears, and some small fruit, matured.

ANNUAL EXHIBITION.

The last day of September and the first two days of October were assigned for the exhibition, but, in consequence of rain, it was not closed till the third of October. The number of entries in the several divisions will best convey an idea of the character and extent of the exhibition.

Of *Cattle*, there were 63 entries, mostly of Short-horns, grades and working oxen—quality very superior. The display would have been much larger but for the rain. Of *Horses*, there were 200 entries—quality very good. Of *Sheep*, there were 79 pens. These were of superior quality, made up of Michigan fine-wooled and mutton sheep. Of *Swine*, 19 pens, made up of Essex, Chester-White, and their grades—all very fine. *Poultry*, 40 coops—one-fourth of valuable varieties; the balance on the pigmy order. Of farm, barn, and house implements, 86 entries. Of *Butter, Cheese, Bread, Honey, Wine, and Canned Fruit*, 120 entries. Of *Green Fruit*, 171 entries—a very beautiful show, considering our great failure in the crop. Of *Grain and Vegetables*, 62 entries. This division was very fair, and the quality good. Of *Domestic Manufactures*, wool, cotton and linen, 101 entries. This was a very creditable representation, as the articles must be made within the year. Of *Needle Work and Embroidery*, 38 entries only—the smallest show ever had in the county. Of *Natural Flowers*, 18 entries; *Paintings*, 64 entries, all by home artists; *Musical Instruments*, 6 entries; *Shells and Minerals*, 13 entries—many rare specimens; making a total of 1,080 entries against 977 last year—an increase of 103. The number of premiums awarded was 453, amounting to \$993 75.

RECEIPTS.

Our receipts from the Fair were.....	\$2,509 90
Cash on hand, October 1st, 1868,.....	144 74
County tax for 1868,.....	155 00
Total,.....	<u>\$2,809 64</u>

EXPENDITURES.

For premiums,.....	\$993 75
Balance of land contract,.....	880 00
Interest and principal on Floral Hall bonds,.....	219 25
Diplomas,.....	26 50
Repairing track,.....	66 87
Improvement in Hall,.....	40 96
Insurance on Hall,.....	81 25
Secretary's salary,.....	100 00
Printing.....	78 50
Expenses of Fair,.....	190 71
	<u>2,627 79</u>
Balance on hand,.....	<u>\$181 85</u>

The Society's grounds are paid for, and comprise 25 acres near the center of the village of Hillsdale, which, with the improvements on them, cannot be estimated at less than \$14,000, with no indebtedness, except about \$1,400 of Floral Hall bonds due in 1872.

From our present stand-point we look forward to future usefulness in a much larger degree than in the past. It has been the labor of years to obtain our foot-hold; but this being accomplished, we may now bend our energies to the source of all material prosperity—the development of our soil. In fact, we have already proposed a series of experiments in the raising of wheat and corn, a copy of which we enclose, with the rules governing the experiments:

SPECIAL PREMIUMS OF \$300.

For the best 5 acres of wheat at any time before the Fair of 1871, raised in the county, yielding over 50 bushels to the acre,....	\$100 00
For the 2d best,.....	50 00
For the best 5 acres of corn, before said Fair of 1871, raised in the county, yielding over 150 bushels of 70 lbs. weight in the ear,	100 00
For the 2d best,.....	50 00

The competitors for the above premium will be required to enter their crops before harvesting, with the Secretary of the Society, when the President, Vice President, Secretary and Treasurer, or a majority of them, will proceed to examine, carefully measure, and set bounds to the same. The exhibitor shall then harvest the crop by itself, preserving the identity of said grain, by the knowledge of two credible witnesses, who with the exhibitor shall make oath as to its being the same raised on the five acres marked out, and no more. When said crop is ready for weighing and inspection, the competitors shall give notice to the Secretary of the Society, who with a majority of the Board, shall at once proceed to weigh said grain, make a record of the kind, amount, and quality, preserving samples of each, and at the Fair of 1871, they shall exhibit said samples, from which, together with the records kept, they shall then and there determine the awards.

The competitors will be required to furnish a statement of the soil, tillage, and fertilizers used, with expenses of cultivation and treatment of the field for two or more years immediately preceding.

Other inducements will be offered from time to time, tending to raise our standard of crops.

Officers for 1869.—Geo. C. Munro, President; Alex. Hewitt, Vice President; F. M. Holloway, Secretary; Daniel Beebe, Treasurer; with an Executive Committee of 18 members, one from each town in the county.

FARMERS', MECHANICS', AND STOCK-BREEDERS' ASSOCIATION OF JONES-VILLE.

This Association held no exhibition in 1868. The officers for 1869, are: W. J. Baxter, President; Geo. C. Munro, Secretary; E. O. Grosvenor, Treasurer.

INGHAM COUNTY.

The Secretary of the Ingham County Agricultural Society, George W. Bristol, states that the Fourteenth Annual Exhibition of the Society was held at Mason on the 24th and 25th of September. A cold rain set in on the first day and continued during the entire exhibition, and defeated to a considerable extent its success. Nevertheless, the exhibition was good. The receipts and expenditures of the Society for the year 1868, are as follows:

RECEIPTS.

Received from the sale of tickets for the annual fair,.....	\$358 84
Received from the county of Ingham,.....	100 00
	<hr/>
	\$458 54

EXPENDITURES.

Paid expenses and old account,.....	\$173 54
Paid premiums,.....	285 00
	<hr/>
	\$458 54

Officers for 1869.—L. H. Ives, President; George W. Bristol, Secretary; D. C. Smith, Treasurer, with three Vice Presidents, and a board of six Directors.

IONIA COUNTY.

W. D. Arnold, Secretary of the Ionia County Agricultural Society, states that the Twelfth Annual Exhibition was held on the new grounds of the Society, near Ionia, from the 7th to the 10th of October, and that although the weather was very unfavorable, the exhibition was a decided success, as the attendance and interest manifested was much increased. The old grounds (ten acres) have been sold for a little more than a quarter of the cost of the new grounds (twenty acres), and the avails applied on the purchase, the balance having ten years to run, though the society may pay it sooner if they choose. The display of stock, including cattle, horses, sheep, and swine,

though not large, was considered good. The other departments were respectably filled.

RECEIPTS.

Amount on hand last year,.....	\$183 20
Received from sale of life member tickets,.....	730 00
Received from annual exhibition,.....	729 59
	<hr/>
	\$1,642 79

DISBURSEMENTS.

Paid for fencing, fitting up new grounds, expenses of annual exhibition, and award of premiums,.....	<hr/>
	\$1,642 79

Leaving the Society indebted on lumber for fencing, \$126.80, and \$230 still due the Society on account of life member tickets sold.

Officers for 1869.—Myron H. Norton, President; Walter D. Arnold, Secretary; James W. Loomis, Treasurer, with a board of five Directors.

JACKSON COUNTY.

George W. Kennedy, Secretary of the Jackson County Agricultural Society, states that the crops of the county for 1868 suffered much from drought, with the exception of wheat, which yielded bountifully, although the quality was inferior to the crop of 1867. Indian corn was about an average crop; oats, two-thirds of an average; barley, three-fourths; potatoes, one-half; hay (upland), an average; marsh hay, owing to drought, two-thirds of a crop; apples, half a crop, of inferior quality.

The Sixteenth Annual Exhibition was held on the Society's grounds, at Jackson, October 1st to 3d, and shared the fate of other societies which held their shows about this time, in regard to unfavorable weather. Still, it will be seen from the following enumeration of the entries, the Exhibition was all

that could have been expected, under the circumstances. Number of entries of Cattle, 81; Sheep, 59; Horses, 153; Swine, 16; Poultry, 22; Grain, 34; Vegetables, 41; Fruit, 50; Bread, Butter, and Cheese, 48; Farm Implements, 36; Domestic Manufactures, 49; Mechanic Arts, 48; Flowers and Plants, 44; Miscellaneous, 71; making a total of 752.

The receipts and expenditures of the Society for the current year are as follows:

RECEIPTS.

Balance on hand at beginning of year,.....	\$457 37
Received for membership tickets,.....	1,050 00
Received from sale of single tickets,.....	509 55
Received from rent of buildings,.....	131 50
Received from County Treasurer,.....	150 00
	<hr/>
	\$2,298 42

EXPENDITURES.

Paid premiums,.....	\$806 90
Paid on purchase of grounds,.....	450 00
Paid on fencing and grading,.....	351 23
Paid expense account,.....	591 40
	<hr/>
	2,199 53
Balance on hand, January 20, 1869,.....	<hr/>
	\$98 89

Officers for 1869.—Morgan Case, President; Geo. W. Kennedy, Secretary; James DePuy, Treasurer; with an Executive Committee consisting of six members, two of whom are elected annually.

Mr. Kennedy gives the following statement of the articles forwarded from Jackson by the Michigan Central Railroad, for the year 1868:

Agricultural implements, 1,528,133 pounds; barley, 88,306 pounds; cattle, 973 head; coal, 12,000 tons; dressed hogs, 1,317; live hogs, 2,112; flour, 46,500 barrels; furniture, 116 car-loads; lime, 1,622,700 pounds; lumber, 590,847 feet; general merchandise, 5,252,472 pounds; mill-feed, 500,000 pounds; oil, 3,104 barrels; potatoes, 1,043,382 pounds; salt, 969 barrels;

sheep, 7,203 head; stone-ware, 253,430 pounds; tallow, 223,430 pounds; wagons (number), 2,400; wheat, 1,980,000 pounds; wool, 530,500 pounds.

Mr. Kennedy says: "The statements of shipments over the Michigan Southern Branch Railroad from this place, have been (in the course of business) forwarded to Chicago, so that I cannot get them. I am not now able to get a copy of the shipments at Grass Lake, Concord, and Parma stations on the Michigan Central Railroad, or those of Napoleon and Norville on the Michigan Southern Branch."

Mr. Kennedy also furnishes some statistics in regard to the number of sheep slaughtered at Jackson in the fall of 1868 and the early part of the winter following. Messrs. Cox, Hood & Co., slaughtered 28,486 head, for which they paid from 50 cents to \$3 per head—averaging about \$1.45. Thomas Kent & Co., slaughtered about 9,000 head, for which they paid an average of \$1. Mr. Kennedy adds: "Our farmers culled out their flocks very closely in the fall, and fattened and slaughtered the cullings; so that over 40,000 sheep were undoubtedly slaughtered here, in addition to those killed by the city butchers."

KENT COUNTY.

The Secretary of the Kent County Agricultural Society, Omar H. Simmonds, states that the Society has expended in the improvement of its grounds, during the year, nearly \$1,000; that the hall erected last year has been thoroughly painted, a long line of horse stables built in a substantial manner, and the track on the grounds much improved. Mr. Simmonds took the position of Secretary, in consequence of the Secretary who was elected, M. Freeman, having removed from the county. In consequence of the death of Warren P. Mills, one of the oldest and most valuable officers of the Society, A. R. Hoag was elected in his place on the Executive Board, and A. N. Norton was

elected to fill a vacancy occasioned by the resignation of W. W. Hatch.

The Society held its Annual Exhibition on the 29th and 30th of September and the 1st and 2d of October. The attendance was good, and the receipts satisfactory, but the second day being stormy, the competition was smaller in the various departments than it otherwise would have been.

The Society is steadily gaining on the public favor from year to year, and is expending its surplus receipts in the improvement of its grounds. The financial condition of the Society, as shown by the Treasurer's Report, is as follows:

RECEIPTS.

Monny received from W. D. Foster, Treasurer, for 1867,-----	\$5 47
Cash from County Treasurer,-----	174 45
“ borrowed,-----	78 57
“ received for use of grounds,-----	26 35
“ “ at Annual Fair of 1868,-----	2,062 14
“ collected by Secretary,-----	126 52
“ for use of grounds for pasture,-----	125 25
	<hr/>
	\$2,598 75

EXPENDITURES.

Cash paid for labor and material for grounds,-----	\$541 87
“ “ painting floral hall,-----	90 00
“ “ printing,-----	160 80
“ “ police and night watch during the Fair,-----	41 25
“ “ assistants of Secretary and Treasurer,-----	42 50
“ “ tax on Fair grounds,-----	34 73
“ “ note at City National Bank,-----	210 00
“ “ “ held by S. W. Garfield,-----	318 00
“ incidental expenses,-----	65 72
“ paid as premiums,-----	784 99
“ expended by President on grounds,-----	124 24
“ on hand,-----	85 15
	<hr/>
	<u>\$1,598 75</u>

It is stated that when the officers of the current year entered upon their duties, they found the Society in debt to the amount

of \$700. This has been paid in full, and a moderate balance left in the treasury.

Officers for 1869.—Geo. W. Griggs, President; Jacob Barnes, Secretary; John Porter, Treasurer; with an Executive Board consisting of five members.

LAPEER COUNTY.

R. G. Hart, Secretary of the Lapeer County Agricultural Society, states that the Annual Exhibition of the Society was held on its grounds on the 23d to 25th of September. The entries and receipts were light, and no particular interest in the exhibition seemed to be manifested. The show of horses, cattle, and farm implements was good. Sheep and swine were poorly represented. The fruit department and floral hall were well filled. One striking feature of the exhibition, though not strictly agricultural, might be legitimately included under the head of manufactures, and is interesting from the information it affords in regard to the natural resources of that section of our State, viz.: a collection of *furs*, consisting of that of the bear, racoon, fox and skunk, with wild-cat robes, gloves, caps, capes and mufflers in abundance, all of which were manufactured in the town of Lapeer.

The constitution of the Society has been so amended that the election of officers is to take place at the winter meeting, on the second Tuesday of January. A list of the officers for 1869 has not been received; but the Secretary is Ira H. Butterfield, Jr.

LEELANAW COUNTY.

The Leelanaw County Agricultural and Horticultural Society was organized the present year, and its President, Rev. George N. Smith, of Northport, furnishes some notes in regard to the first Annual Exhibition of the Society, held at Leeland, on the

20th and 21st of October. Mr. Smith states that, considering the newness of the county, the unfavorable weather, &c., it was highly satisfactory. Grains, fruits, and vegetables exhibited, were of the first quality. Horses and cattle were good, and there was a very creditable display of ladies' work. The Secretary of the Society is G. Verfurth, of Leeland.

MACOMB COUNTY.

The Secretary of the Macomb County Agricultural Society, Daniel B. Briggs, states that the Nineteenth Annual Exhibition of this Society was held at Romeo, on the 17th to the 19th of October. Although the weather was unfavorable, the number of entries exceed that of any former exhibition. The different classes of stock were well represented. The display of Devon cattle and swine far excelled that of previous years, and was highly creditable to the exhibitors. The show of horses compared favorably with previous fairs, 203 entries being made in the four classes, viz: for All Work, Draught, Roadsters, and Matched Spans.

Both Floral and Vegetable Halls were filled to their utmost capacity. The liberal premiums awarded for township and district collections of fruit, brought out a fine display, in spite of the unfavorable season. This department would have done credit to a State Fair.

Whole number of entries, 981.

Premiums offered, amounting to.....	\$1,325 25
Premiums awarded, amounting to.....	939 50
Total receipts during the Fair,.....	1,381 80

The Society, at its annual meeting, voted to purchase the grounds which, for several years past, have been leased for holding the Annual Fairs of the Society. There are 12½ acres in the enclosure, fenced in a substantial manner, with respectable buildings. The grounds are admirably adapted to the purpose. Every part of the track can be viewed from any point. It is

proposed in order to raise funds to effect the purchase, to issue a life-membership certificate to any person resident of the State who shall pay \$10 or more in one payment, said certificate entitling the person to all the privileges as a member, during his life.

Officers for 1869.—George W. Phillips, President; P. M. Bently, Vice-President; Daniel B. Briggs, Secretary; A. W. Sterling, Treasurer; with a Board of eight Directors.

OAKLAND COUNTY.

The Secretary of the Oakland County Agricultural Society, Geo. W. Brock, presents the following statement of the receipts and expenditures of the Society for the year 1868:

Total receipts from the horse fair, June, 1868,.....	\$2,801 49
Subscriptions not collected,.....	\$50 00
Also amount due for feed, not collected,.....	20 09 .70 00
	<u>\$2,781 40</u>
Total expenditures for horse fair, June, 1868,.....	2,159 37
Net proceeds of horse fair,.....	<u>\$572 03</u>
Total receipts from County Fair, fall of 1868,.....	\$3,320 08
Total expenses of County Fair, fall of 1868,.....	2,960 42
Net proceeds of County Fair,.....	359 66
Total net proceeds of both Fairs,.....	<u>\$981 69</u>
Amount received from Oakland County, fall of 1868,.....	232 30
Total net receipts,.....	<u>\$1,163 99</u>
Deduct amount expended for permanent improvements,.....	126 00
Total amount of receipts over all expenditures,.....	<u><u>\$1,037 99</u></u>

The following are extracts from the Secretary's Report:

"At the last annual meeting of the Board of Directors, they did not deem it advisable to offer a premium for Herefords, and it subsequently appearing that there was some dissatisfaction on that account, the Board, on meeting at the Annual Fair,

thought proper to offer a first premium to exhibitors in this class. Upon the conclusion of the exhibition, the premiums were awarded to Edwin Phelps, Esq., of the town of Pontiac, amounting, in all, to the sum of \$40, which Mr. Phelps has very generously donated to the Society. I would respectfully recommend that Mr. Phelps be remembered at the next annual meeting for his generosity.

"It is, perhaps, not out of place to mention the growing interest which appears to be manifested by the farmers of this county in the improvement of stock of all kinds, and especially of horses. The exhibition of horses held in the month of June last, under the auspices of the Society, was large and well attended, and the exhibition, both at the horse fair and county fair, of carriage horses, farm horses, and horses for general purposes, displaying endurance, power, style, and speed, were, it is believed, second to no exhibition of the kind ever held in the State. In conclusion, your Secretary would say that the Society's grounds are in good condition, the affairs of the Society are in a condition to be fully understood and appreciated by all its members, and although the balance-sheet for the last year does not show as large an amount of net income as it was hoped and expected would be realized, yet the Secretary feels safe in congratulating the members of the Society upon the present condition of its affairs, and, also, upon the prospect that, with good management and liberal support, it may soon become the strongest and most successful association of the kind in the State."

Officers for 1869.—Lysander Woodward, President; M. E. Crofoot, Chairman of Business Committee; George W. Brock, Secretary; with a Board of ten Directors.

OTTAWA COUNTY.

The Secretary of the Ottawa County Agricultural Society, Miner Hedges, states that the Society held its Thirteenth Annual Exhibition on the Society's grounds, near Lamont, on the

7th to the 9th of October. The weather being cold and stormy, the attendance was not as good as usual. The receipts were \$260, which, after paying all premiums and incidental expenses, leaves \$150 in the treasury. The Society needs larger exhibition grounds, and has authorized the Executive Committee to purchase and fit grounds for the next exhibition. The entries for the exhibition of 1868, were as follows:

Cattle, 44; horses, 59; sheep, 20; swine 10; implements, 43; dairy, &c., 121; domestic goods, 43; fancy articles, 12; fruit, 23; vegetables, 49; field crops, 56; flowers, 10; making a total of 490.

Officers for 1869.—Simeon Hazelton, President; C. A. Van Slyke, Vice President; John Luther, Secretary; Miner Hedges, Treasurer; with an Executive Committee consisting of seven members.

Mr. Hedges sends an account of a crop of Indian corn, grown in 1868, by C. S. Randall, of Talmadge, which is, substantially, as follows:

The crop grew on twenty-six rods less than six acres, and the aggregate produce was 618 bushels of *shelled corn*.

CROP, DR.

Ploughing,.....	\$9 00
Cultivating,.....	9 00
Marking and planting,.....	7 50
Cultivating,	14 00
Cutting up,.....	12 50
Board of hands and team,.....	20 00
Seed,	3 75
Use of land, \$5 per acre,.....	29 00
Husking, drawing, and stacking stalks,.....	50 00
Marketing corn,.....	30 00
	<hr/>
	\$184 75

CROP, CR.

By 618 bushels of corn, @ 80 cents,.....	\$494 40
By stalks, for which was offered in the stack,.....	60 00
	<hr/>
	\$554 40
Deduct cost,.....	184 75
	<hr/>
Net profit,.....	\$369 65

SAGINAW COUNTY.

From a statement forwarded by George F. Lewis, Secretary of the Saginaw County Agricultural Society, it appears that its prospects are encouraging. The following is presented as showing the financial condition of the Society:

Total receipts from all sources since December 28, 1867,-----	\$3,676 12
Expenditures,-----	3,667 53
Balance in hands of Treasurer,-----	<u>\$8 59</u>
Value of buildings and improvements to grounds, &c.,-----	2,520 00
Funds in Secretary's hands,-----	31 60
Total assets,-----	<u>\$2,560 19</u>
Estimated indebtedness,-----	1,000 00
Balance,-----	<u><u>\$1,560 19</u></u>

It is stated that though "the Society finds itself, for the first time, in debt, better and more substantial progress has been made during the past year than in any previous year since its organization, and it may now be regarded as established." A tract consisting of 28 acres, near the north line of the city of East Saginaw, has been leased for six years, for the use of the Society. The following statement of a corn crop was presented to the Executive Committee at the annual meeting, and referred to the Committee on Field Crops, to be reported on at a future meeting:

SAGINAW, December 24, 1868.

Statement of corn crop, three acres, lightly manured, ploughed medium depth, and planted about the 20th of May, and harvested about the 15th of September. Yield per acre, one hundred and thirty-three bushels.

BENJAMIN MCLELLAN.

The statement was sworn to before a justice of the peace by the person who made it. Whether the committee to whom it was referred will require any further particulars, is not

stated. As the claim now stands, it is somewhat remarkable for its brevity and indefiniteness.

Officers for 1869.—Wm. J. Bartow, President; George F. Lewis, Secretary; Thomas L. Jackson, Treasurer; with four Vice Presidents, and an Executive Committee consisting of seven members.

ST. JOSEPH COUNTY.

L. A. Clapp, Secretary of the St. Joseph County Agricultural Society, sends the following account of the operations of the Society for the year 1868:

“The Eighteenth Annual Exhibition was held on the grounds of the Society at Centreville, September 30th and October 1st and 2d. The continuous rain during the first and through the forenoon of the second day, prevented the entries from reaching the usual number. But the weather being good during the latter part of the exhibition, the attendance was very large, indicating that under favorable weather the affair would have been in every respect a complete success.

“The committees on the several classes of the exhibition all seemed well pleased at receiving copies of the Report of the Secretary of the State Board of Agriculture.

“The Society has during the year built about 100 rods of fence, at an expense of \$226.87; also a grand stand, 20x72 feet, at a cost of \$690. The property of the Society is not encumbered, and consists of seventeen acres of level, beautiful land, enclosed with a good high fence. The buildings are, one two-story building about 100 feet in length, used for the exhibition of domestic manufactures, vegetables, grain, fruit, &c.; one octagon building, for floral designs, &c.; a grand stand, and a good office-building for the Secretary and Treasurer. The financial condition of the Society is as follows:

RECEIPTS.

Amount in Treasury Dec. 14, 1867,-----	\$708 37
Received at Annual Fair of 1868,-----	1,665 00
	<u>\$2,368 37</u>

EXPENDITURES.

Building fence,-----	\$288 69
“ grand stand,-----	690 00
Expenses of Annual Fair,-----	587 00
Premiums awarded,-----	666 00
Amount now in Treasury, (Dec. 12, 1868,)-----	141 68
	<u>\$2,368 37</u>

The above having been forwarded before the election of officers for 1869, the list cannot be given.

TUSCOLA COUNTY.

The Executive Committee of the Tuscola County Agricultural Society, through the Secretary, C. C. Stoddard, present a valuable report for 1868. Having spoken of the success which has attended the Society in its efforts to advance the interests of Agriculture and Manufactures in the county, and given an encouraging word in reference to continued exertion in this direction, the report submits a summary of the products of the county for the year, as follows:

FIELD CROPS.

The past season, taken as a whole, has been quite favorable for farming operations, giving the careful husbandman ample time to plant, cultivate, and gather in the products of his labor.

Wheat.—This crop richly repays the cultivator in almost every part of the county. A large breadth is annually sown. The yield this year will, we think, reach an average of twenty bushels per acre. We think the amount raised was never exceeded in the county in any one year. Spring wheat is not so

much sown, but was a very fair crop. The midge injured the variety known as the Soules wheat, somewhat, but not so seriously as in some former years. The Treadwell wheat is raised to a considerable, and the Diehl to a limited extent. Both these varieties promise well.

Indian Corn.—This suffered materially in spring, in consequence of continued wet and cold weather, but the months of July and August being warm and favorable for the growth of this important crop, an unusual amount per acre was harvested. The yield probably amounted to forty bushels per acre.

Oats.—This crop has been a very good one, averaging, perhaps, forty bushels per acre; in quality they are rather light, owing to extreme hot and dry weather during the season of their growth.

Buckwheat.—The season has been tolerably favorable for the growth of this crop, and a considerable amount has been raised, adding very materially to the resources of the farmer.

Beans.—Notwithstanding the very high price beans have commanded in past years, few have been cultivated. Those who have raised them, have done so with profit to themselves. In quality, beans were very good.

Hay.—Of hay, an average crop, of good quality, was secured. We much need the use of labor-saving machines to enable us to secure the crop seasonably, and without damage from rain. Mowing machines and horse-rakes will become generally used as our farms become freed from stumps and other obstructions that impede their progress. A few are now used, and it is to be hoped that they may be more generally introduced as our farms become better cultivated.

Potatoes.—Potatoes were not as good, either in quantity or in quality, as last year. The extreme dry weather of July and August retarded the process of setting until a very late day, and when the rains finally fell, the tubers grew rapidly until frost came, but were not as good in quality as is usual; a fair crop, however, was realized.

We cannot boast of so large a crop of apples as last year, still those raised were of unusual excellence. Although the business of fruit-raising is yet in its infancy with us, it has already been demonstrated that Tuscola county can hardly be beaten by any locality of Michigan for the production of apples and many of the smaller fruits; while peaches and pears succeed admirably in some neighborhoods, particularly about Watrousville, and along the shore of Saginaw Bay.

In horticulture, there is still a great chance for improvement, particularly in the cultivation of cherries, plums, and berries of various kinds. These would be cheap luxuries, in which the poorest might indulge, if he owned but an acre of soil. The hardier kinds of grapes succeed well, too, and might be much more extensively cultivated than they now are, with both profit and pleasure to those willing to give the necessary attention.

LIVE STOCK.

Horses.—A laudable degree of interest seems still to be manifested in the production of good serviceable horses, preference being apparently given to the heavy farm or draft horse. This is as it should be. While a graceful, fast-traveling animal may be very desirable for the road, the substantial, enduring animal must, for the farmer at least, take precedence of all others.

Cattle.—Of cattle, there are some very fine specimens of grade and native stock. The further infusion of Devon and Short-horn blood would greatly improve our stock, and would also greatly enhance the money value of this part of farm property. A marked degree of improvement has already been made in respect to oxen, cows, and young cattle.

Sheep.—In sheep, our farmers seem to be changing base, somewhat. The great demand and high prices paid for Merino wool and its grades, in past years, stimulated the production of that class of wool to an enormous extent. Now, longer

wools are in demand, consequently Leicester and Southdown sheep are taking the lead. Some very fine specimens of both fine and coarse-wooled sheep may be found upon many farms in the county. The interest in sheep husbandry seems to be somewhat abated.

Swine.—Considerable attention is being given to the improvement of the breeds of hogs; and we were glad to notice the exhibition of specimens of some choice varieties at the fair. Considering the present prices of corn and pork, the business would, no doubt, be remunerative if more extensively engaged in.

MANUFACTURES.

Our manufactures are in a flourishing condition. We hope and believe that ere long, almost, if not quite all implements and machines pertaining to the business of farming, together with articles of necessity, comfort or convenience, will be produced at our hands, within the limits of our own county. Let the farmer provide himself with the products of the skill of our artisans and mechanics as fast as his needs require, or his means will allow. . .

The Third Annual Exhibition of the Society was held on its grounds at Watrousville, on the 29th and 30th of September, and the first of October, and notwithstanding the unfavorableness of the weather, the attendance of visitors was fully equal to that of the previous year, and the exhibition on the whole satisfactory. The address on the occasion was delivered by C. H. Dennison, of Bay City. In reference to the financial condition of the Society, the following synopsis is given from the Treasurer's Report:

Receipts for the entire year,	\$862 37
Expenses,	639 31
Balance on hand,	<u>\$223 06</u>

VAN BUREN COUNTY.

O. H. P. Sheldon, Secretary of the Van Buren County Agricultural Society, states that he is unable to make as favorable a report in regard to the Annual Exhibition of the Society as was made for 1867. On the first day of the exhibition there were 480 entries; but on the second day it rained all day, which broke up the programme. It was decided to hold over another day, making the exhibition include four days, but the people at a distance not knowing of this arrangement, the attendance was much less than it otherwise would have been. The entries were as follows: Horses, 156; cattle, 37; sheep, 28; swine, 9; fruit, 109; vegetables, 109; grain, 22; miscellaneous, 232; making a total of 697. The Treasurer's report exhibits the financial condition of the Society as follows:

RECEIPTS.

Cash in Treasury Dec. 28, 1867,.....	\$460 04
Receipts from Exhibition, 1868,.....	548 46
	<hr/>
	\$1,008 50

EXPENDITURES.

Paid orders,.....	\$774 76
“ stationery, &c.,.....	88
Cash on hand,.....	227 86
	<hr/>
	\$1,008 50
With cash on hand Dec. 29, 1868,.....	\$227 86
And county orders for two years, (1866-67).....	172 34
	<hr/>
The amount in the Treasury is.....	\$400 20

WESTERN MICHIGAN LAKE-SHORE HORTICULTURAL ASSOCIATION.

The progress of fruit culture along the eastern shore of Lake Michigan is probably more rapid, and is at this time attracting more attention than is given to that business in any portion of the West. The public eagerly seizes on all facts touching this important and growing interest, and in view of furnishing, as far as practicable, information that can be relied on, the following statistics and other matter brought out by the Association known by the above title, is given. Jacob Ganzhorn, of Spring Lake, Ottawa County, Secretary of the Association, forwarded the statistics of fruit culture, the list of tested fruits, and the report of the doings of the Convention of Fruit-Growers. In the course of his correspondence, Mr. Ganzhorn gives some items of interest not included in the regular papers. He mentions that an Isabella grapevine, four years old, growing in the village of Spring Lake, bore in 1868, 100 lbs. of fruit. A Concord vine of the same age, though in another garden, bore 42 lbs., and a Clinton, along side of it, 100 lbs. A four-year-old Catawba vine, in the same garden, trained to a building, and covering a space of about 16 feet high, and 24 feet wide, bore 100 lbs.

STATISTICS OF THE FRUIT CROP OF SPRING LAKE AND VICINITY—NOT EXCEEDING FOUR MILES FROM ANY POINT OF THE VILLAGE—FOR THE YEAR 1868.

Fruit culture in this section is yet in its infancy, though many orchards, vineyards, and small fruit plantations are established, many of which are quite extensive. To give some idea of what is already planted, I will state, that not over five per cent. of what is planted bore this season, and the products amounted to \$37,105 80.

All kinds of fruits mentioned in these statistics (as far as tested) succeed exceedingly well in this section, and all bore full crops this season, except the apple, which is estimated at one-third of an average crop.

The varieties of *Apples* now most in bearing are the Baldwin, R. I. Greening, Gale's Russet, Kirtland Pippin, Rambo, and Red Astrachan, though all leading and promising varieties are planted. Of the *Pear*, the Louise bon de Jersey, Duchesse d'Angouleme, Vicar of Winkfield, and Bartlett. The varieties of *Peaches* are quite numerous, though the most extensive for market are: Early Crawford, next, Early Barnard, Hale's Early, Late Crawford, and Smock (free). *Grapes*, the Concord, Delaware, Isabella, Catawba, Hartford Prolific, and Clinton. All varieties of late introduction which are of promise are planted, though their merits and adaptation to this soil are yet to be tested. The Concord and Delaware are the most extensively planted. The Concord decidedly takes the lead of all varieties yet tested as the most profitable, on account of its hardiness and productiveness. The varieties above mentioned have always ripened well since coming into bearing, except the Catawba, which has not generally ripened well the last two seasons; though in some favorable situations it ripened thoroughly. It has, however, ripened some years in succession before. The grape receives much attention, and from all evidence will be the leading branch next to the peach, which stands at the head at present, of fruit culture along the Lake shore. Mildew and rot among grapes are not known here.

Of small fruits the Kittatiny and Wilson's Early *Blackberry* are most planted, but have not borne yet. *Raspberries*—Doolittle's Black-cap and Philadelphia. *Strawberries*—the Wilson's Albany and Agriculturist. *Currants*—Red Dutch, Cherry, White Grape, and Black Naples.

The quantity of different fruits raised, and the average proceeds of the same, are as follows:

Apples,	717½	bu., at	\$1 50,	\$1,078 25
Pears,	55½	“	8 00,	442 00
Peaches,	10,323½	“	3 25,	32,552 18
Cherries,	23	“	5 00,	115 00
Plums,	15½	“	5 00,	77 50
Quinces,	11½	“	5 00,	57 50
Grapes,	5,815	lbs. at	15c.,	872 25,
Currants,	182	bu., at	2 56,	465 92
Gooseberries,	26	“	3 20,	83 20
Raspberries,	16½	“	8 00,	129 00
Strawberries,	48½	“	4 80,	231 60
Blackberries,	½	“	4 80,	2 40
Crab apples,	½	“	4 00,	1 00
				<u>\$37,105 80</u>

CATALOGUE OF TESTED FRUITS RECOMMENDED BY THE WESTERN MICHIGAN
LAKE-SHORE ASSOCIATION.

APPLES.—*Summer*: Red Astrachan, Early Harvest, Keswick Codling, Primate, Porter. *Fall*: Maiden's Blush, Rambo, Fall Pippin, Autumn Strawberry. *Winter*: Baldwin, Rhode Island Greening, Wagener, Esopus Spitzenburg, Golden Russet, Fameuse, Yellow Bellflower, Canada Red, Monmouth Pippin, Lady Apple, Talman Sweeting, Roxbury Russet. As promising well, but not sufficiently tested: King, Wine-sap, Cooper's Market, Hubbardston Nonsuch, Dominie, Swaar, Green Sweet.

PEARS.—*Standard*: Bartlett, Duchesse d'Angouleme, Louise bon de Jersey. *Dwarf*: Duchesse d'Angouleme, Louise bon de Jersey, White Doyenne, Glout Morceau, Vicar of Winkfield, Seckel, Buffum, Urbaniste.

CHERRIES.—*Heart Cherries*: Black Tartarian, Knight's Early Black, Bigarreau, Gen. Wood, Yellow Spanish. *Dukes and Morellos*: Early Richmond, May Duke, Belle Magnifique.

PEACHES.—Early Crawford, Early Barnard, Hale's Early, Smock (free), Late Crawford, Morris White, Jacques' Rareripe.

QUINCES.—Orange.

CRAB APPLES.—Red and Yellow Siberian, Hyslop.

GRAPES.—Concord, Delaware.

CURRENTS.—Red Dutch. As promising, but not yet tested:
Cherry, Versailles, White Grape.
BLACK CURRANTS.—Black Naples.
GOOSEBERRIES.—Houghton's Seedling.
RASPBERRIES.—Doolittle's Black-cap, Philadelphia.
STRAWBERRIES.—Wilson's Albany (best for market), Agriculturist, French's Seedling.

PROCEEDINGS OF THE FRUIT-GROWERS' CONVENTION, HELD IN SPRING LAKE,
OTTAWA COUNTY, MICHIGAN, FEBRUARY 3D, 1899.

In the early part of January, the Western Michigan Lake Shore Horticultural Association, located at this place, issued a call for a General Convention of all the fruit-growers along the shore of Lake Michigan, hoping that thereby a permanent organization might be formed. In response to the call, the Convention met at the appointed time, and was called to order by the President of the Association.

On motion of J. Ganzhorn, J. H. Newcomb was nominated and elected Chairman, and W. G. Sinclair, Secretary.

ASPECT FOR PEACH ORCHARDS.

Mr. Peck, of Muskegon, being called upon, introduced for discussion, "The aspect for peaches."

D. B. Thorp, of Crockery, said he had been in the nursery business about twenty-five years; had lived in New Jersey, Illinois, and for several years past in this vicinity; thought it a business that required a great deal of study. In regard to soil and aspect, he thought any soil that was dry enough would do, and that the land in this vicinity, and, in fact, almost anywhere along the lake shore of western Michigan, was adapted to the raising of all kinds of fruits; that no fruit tree could live any length of time in wet, cold lands, unless it was the plum. He asked all who had trees planted in wet, cold lands, to examine their roots, and they would find them all black. This he thought evidence enough that all trees required a dry

soil. Sand, or sandy loam is best adapted to peaches, but they would do well in any soil that was dry. The aspect, or locality, is not of so much importance as dry soil. He thought at one time that one aspect was right, then again that another was best; at one time that one locality was the best, and at another, the opposite.

Mr. Husted, of Lowell, thought that at Lowell the peach tree succeeded best in rather a heavy soil.

Mr. Lovell, of Spring Lake, extensively engaged in peach-culture, thought the highest lands produced the best trees, as well as the most fruit; also, that all trees in this vicinity that are not protected by any wind-breaks, or belts of timber, have always done the best, and produced the most fruit. As regards aspect, he thought that land nearly level was as good as any. His land is nearly level, or as near as may be, with a low place on one side, and the peach trees and buds always suffer most there, when in the other parts of the orchard they would not be hurt at all.

Mr. Ganzhorn also recommended high land as best adapted to successful peach-raising, and according to his observations, trees on elevated land are the thriftiest; those in low places, (basin-shaped) unhealthy, and often killed.

Geo. Seagrove thought that high land was far preferable, and would advise all to plant their peach trees on their highest land; was well satisfied that they would be pleased with the result, after seeing a few failures on low lands.

J. W. Curtis, recently from Wisconsin, said he did not know much about the fruits of this place, but would concur with the gentleman who preceded him.

T. D. Denison was decidedly in favor of a northern or eastern slope, and had trees on the poorest land, with an eastern slope, and his best peaches always grew there.

The chairman said he had observed that trees that were on the highest ground seemed to escape frost, when those planted where water could stand around their roots, were almost always badly injured.

Mr. Moulton, of Muskegon, formerly of St. Joseph, said he had been in the fruit business ten years, or more, and had observed the following rules: 1st. Peach trees will not grow with wet feet. 2d. Trees that are budded right in the fall, and the buds not swollen by warm weather at that season, will stand the cold weather better, and the buds will live even if the mercury sinks as low as 15° below zero; but if buds should be swollen in fall, they will not stand cold lower than 6° below. Spring frosts are also more apt to hurt them. He would advise planting trees near large bodies of water, if possible, to prevent winter-killing.

Mr. Peck asked: "How many full crops of peaches did you have in St. Joseph in the last ten years?" Mr. Moulton: "I think four."

Mr. Lovell said that at Spring Lake there had been in the last ten years, or since the orchards have been bearing, only three failures.

Mr. Walsh strongly advocated planting the peach tree near bodies of water.

Mr. Peck has trees that bore in five years after planting, and his first trees were planted in 1861 and 1862. About 100 that were in a hollow, or low place, winter-killed.

Mr. Rowe, on north side of Black Lake, has land that slopes to the east and south, and considers it the best; thinks the breeze from Lake Michigan is one of the reasons why peaches can be raised so successfully on the shore.

Mr. Stocking, of Black Lake, thought the high bluffs along the western shore were the best peach lands, and that we should be likely to raise peaches there every year, when further back they would be winter-killed.

D. Cutler, of Grand Haven, thought the forests should be left as a protection to all fruits, as that would help to keep off cold winds, and have a tendency to preserve the fruits from frosts.

DISTANCE FOR PLANTING TREES.

Mr. Stocking would like to introduce for discussion, the distance for planting peach and apple trees, and how they would do planted together.

Mr. Ganzhorn would recommend planting peach trees 25 feet apart each way, as the trees at such a distance will grow more stocky, and let the sun more around the trees and fruit, which is very important to give flavor and color to the latter.

Mr. Badger thought if he was going to plant a peach orchard, he would plant his trees 18 feet apart. Said that in New Jersey and Delaware the distance was almost always 18 feet.

Mr. Walsh would advise planting peach trees 12 feet apart on this soil, and also planting one-quarter apple trees, so that when the peach trees died, the apple trees would be the right distance, and would then be bearing, giving you an apple orchard.

Mr. Rowe would advise planting peach trees 18 feet apart, but would not advise planting apple trees among the peach trees, as when the peach trees get large enough to bear, the limbs extend out so far that you could not much more than half cultivate the apple trees, and he believed in thorough culture.

J. S. Lord, of Spring Lake, would introduce as the next subject for discussion, whether the soil along the western shore of Michigan is adapted to the apple.

Mr. Rowe said apple trees around Black Lake are growing and doing as well as any apple trees could do, and from all appearances this soil is adapted to them.

W. G. Sinclair has apple trees in bearing, and as evidence of what the apple would do in this soil, exhibited some apples (Baldwin). If such apples can be raised here, there is no question as to whether the soil is adapted to this fruit. Mr. Sinclair has had four crops from apple trees ten or eleven years old.

Mr. Savidge would like to know if trees in this soil, when 20 years old, would still keep bearing. He has some that are about that age, and they all set full in the spring, and some grow until they get about the size of walnuts, when they drop off.

Mr. Sinclair knows of a few trees that are 20 years old, and still bear every year.

E. Edgar, of Wright, said he had lived in that town for two years, and where he got his apples the trees were loaded both years; the trees were about 15 years old.

Mr. Badger thinks the reason why some apple trees do not bear is, that the grafting or budding is done by taking scions from trees in nursery rows, and this is done year after year, taking trimmings from small trees in the nursery. I know of trees that are large enough to bear several bushels, but do not bear scarcely any.

Mr. Ganzhorn has grafted and budded for the past 12 years, and it is the common practice among nurserymen to use scions from small trees out of the nursery, and buds or scions of one year's growth are used. Buds or scions inserted in a young tree, will grow to wood—making the tree; and buds inserted in a limb that is of bearing age, will grow into fruit-spurs, providing the limb is left whole.

Mr. Husted said the common practice among nurserymen is to use the trimmings of nursery trees. He has always followed the same. In starting a new nursery we are sometimes obliged to take scions from bearing trees, but as soon as we can get them from the nursery we prefer to use them. He has never heard that apple trees that were grafted with scions taken from trees in the nursery did not bear, and thinks that we should have few apples if trees that were not grafted from the scions of bearing trees did not bear.

AGE OF TREES FOR PLANTING.

The subject for discussion next introduced was, The best age of trees for planting.

Mr. Ganzhorn would recommend two-year-old trees, as at that age they could be taken up from the nursery with their fibrous roots preserved, which are of great importance to the safety of transplanting the tree.

Mr. Husted said, as regards age, a two-year-old tree is in some respects the best. You take a young tree and plant it, and you will have roots to correspond with the top, and consequently the tree has a better chance to start.

The Chairman asked, Which tree, at ten years after planting, would be best, the two-year-old, or the four-year-old?

Mr. Ganzhorn said a four-year-old tree, well grown to the age of four years, and then properly taken up from the nursery, also planted properly, and thereafter well cared for, might be as good as the two-year-old, but he would prefer a two-year-old, and thinks it would be as much advanced at the end of ten years, as the tree started at four years old. He prefers a low-headed tree, and for this reason would rather start with a young tree that affords the desired form.

Mr. Moulton likes a tree that is old enough so that when planted, it will grow, whether it be two or four years old; but as a general thing would prefer a two-year-old tree. It depends more on the growth of the tree than the age. He would take a four-year-old tree as soon as a two-year-old, providing the head had been properly formed, and that when taken up, the roots were taken up too.

Mr. Husted said that in taking up a four-year-old tree, its fibrous roots are more or less lost, and when planted, the tree has to depend much on the older roots, which do not start as well as the younger, as fibrous roots must be started again, from which the tree must take its new growth. So, when a younger tree is started with its fibrous roots preserved, corresponding with its top, the tree will grow right along, and get

established, while on the other hand, the older tree, in most cases having more top than corresponding roots, its branches must necessarily be shortened in, thus losing one year's growth, while the younger tree is by this time establishing its head, and is growing; so that, all things considered, he does not think the older tree would be any better at ten years' after planting than the younger one.

MODE OF PLANTING TREES.

The subject next introduced for discussion was, the mode of planting trees, and the care of the same after planting, for the first year. This was thoroughly discussed, and it was agreed that thorough culture was absolutely necessary for trees, in order that they might get sufficient growth during the first season after planting to ripen the new wood, so as to stand the winter without being injured by frost. Mulching was also recommended as soon as the tree is planted, to prevent the earth around the roots from getting dry, and to retain moisture.

Mr. Dale, of Chicago, was then introduced by the chairman, and delivered an address, from which the following is an extract:

"Members of the Association: Allow me to congratulate you on the remarkable success of your organization, and the unequaled situation of the country which you occupy. Your Society is yet in the swaddling clothes of infancy, but if 'coming events cast their shadows before,' I predict that you will shape the destiny of perhaps the greatest and most prosperous fruit-growing region on this continent. Situated as you are, midway between the East and West, on one side a magnificent inland sea, on the other a navigable river, forming a huge peninsula; with railroad communication with the East, and new railroad enterprises progressing in all directions; with a climate whose summers are cooled, and whose winters are warmed, by the prevailing south-west winds sweeping across Lake Michigan, making it, therefore, more uniform and salubrious than that of any other inland State; with that climate wonderfully

adapted to the successful culture of the peach, and other delicious fruits; with your close proximity by water communication to Chicago, the metropolis of the great North-west, and greatest railroad center in the world, affording a ready and accessible market for every production, and whose future growth and prosperity will become in a measure your own; with a warm, quick, generous soil, immense forests of the most valuable timber, all these comprise so many unequaled natural advantages, that it requires no gift of prophecy to discern in the not very distant future, a prosperity and development, which to us, now, might seem incredible. A very few years has transformed a wilderness into the busy and prosperous scene which we see around us to-day; and many of your pioneers are yet young men. Very soon the prospect from the spot where we stand must be of surpassing loveliness. The banks of the beautiful little bayou—Spring Lake—will be a continuous succession of elegant villas, smiling gardens and thrifty orchards; and its waters disturbed by fleets of craft, plying to and from a multitude of markets. And so elsewhere the great work of improvement will go on, until all this favored region, which is accessible to shipping facilities, will be one vast scene of horticultural thrift and beauty.”

A vote of thanks to Mr. Dale, for his very able address, was carried unanimously.

The holding of another Convention, next winter, was recommended, and a committee chosen to fix the time and make the necessary arrangements.

TRANSPLANTING AND PRUNING TREES.

On the assembling of the Convention on the second day, the further discussion of transplanting and pruning fruit trees was taken up. Mr. Husted gave his theory and method. He thought trees should be set, as nearly as might be, as they stood in the nursery, in respect to depth, rather hauling about them what more soil might be required. They should not be

cut back too close, but properly thin out unnecessary limbs. Would begin to trim from transplanting, following it up yearly, and not, by neglect, necessitate the work and evils of cutting off large limbs. Soil to be well packed around the trees in planting; the after-culture, shallow ploughing, at least as far out as the branches extend. A very excellent practice, as a stimulant, and protection against insect ravages, was, to sow land plaster broadcast among and on the trees, when the dew was on them.

Mr. Peck advocated deeper planting on light soils than what was, perhaps, necessary on heavier, or clay soils. Trees should be set leaning to the south-west, or west, on account of prevailing winds. When shortening-in peach trees (if leaning), leave the terminal buds of the west side of the tree, on the underside of limbs; and on the east side, leave terminal buds on the upper side of limbs, thus keeping the top balanced and upright.

DWARF PEAR TREES.

Some discussion on dwarf pear trees followed next, when some members favored the planting of such trees, on account of their coming into bearing when quite young, and if set deep, would ultimately take roots from the pear stock, and thus be converted into standards.

Mr. Husted thought that if this way of managing dwarf pear trees was successful, it would be advisable to plant dwarf trees, as they were more easily made to live when transplanted—the quince root more readily growing than that of the pear.

Mr. Ganzhorn knows of dwarf pear trees that were made standards by deep planting, but would not recommend the method. If he wished to have standard trees, he would rather start with standards, as when a dwarf is turned into a standard, the quince roots decay, and thus leave a decaying bulk of roots beneath those of the pear.

CULTURE OF SMALL FRUITS.

The discussion of small fruit culture engaged the Convention a short time. Mr. Ganzhorn said he believed this soil well adapted to small fruits, and their cultivation may be made profitable in this locality; that of the strawberry, raspberry, and blackberry, \$500 to \$1,500 per acre annually can be realized if proper cultivation be pursued. John L. Edgar's strawberry culture had been a success. His first crop from about 75 rods of ground, had yielded 117 bushels of berries, which he sold for \$555. Eighty bushels, sold in Milwaukee, brought him \$9 per bushel. For the Jucunda, he received 30 cents a quart. Considered this a good variety, but requiring a strong soil. He thinks the Filmore, Wilson's Albany, and Jucunda strawberries the best for shipping.

Some member asked what varieties of raspberries and blackberries were most profitable, and best adapted to this soil and climate. Mr. Ganzhorn has seen the Philadelphia raspberry fruiting here the last season, and has formed a high opinion of that variety; would recommend its planting. The Lawton blackberry winter-kills here; would, in its stead, plant the Kittatiny and Wilson's Early.

FRUIT BASKETS.

The subject of Fruit-baskets was next proposed and discussed. The description of a quart basket, designed by Mr. Edgar, was first given. It consists of two very thin strips of basswood or ash crossing each other, and bent up to form a square box of the required size, the top somewhat drawn in, leaving the corners open, and fastened by a thin strip both inside and out; that inside lower down—making a strong, cheap basket.

"The Melish Fruit-basket," manufactured by the "Grand Haven Fruit-basket Company," at Grand Haven, was next presented, and favorably considered.

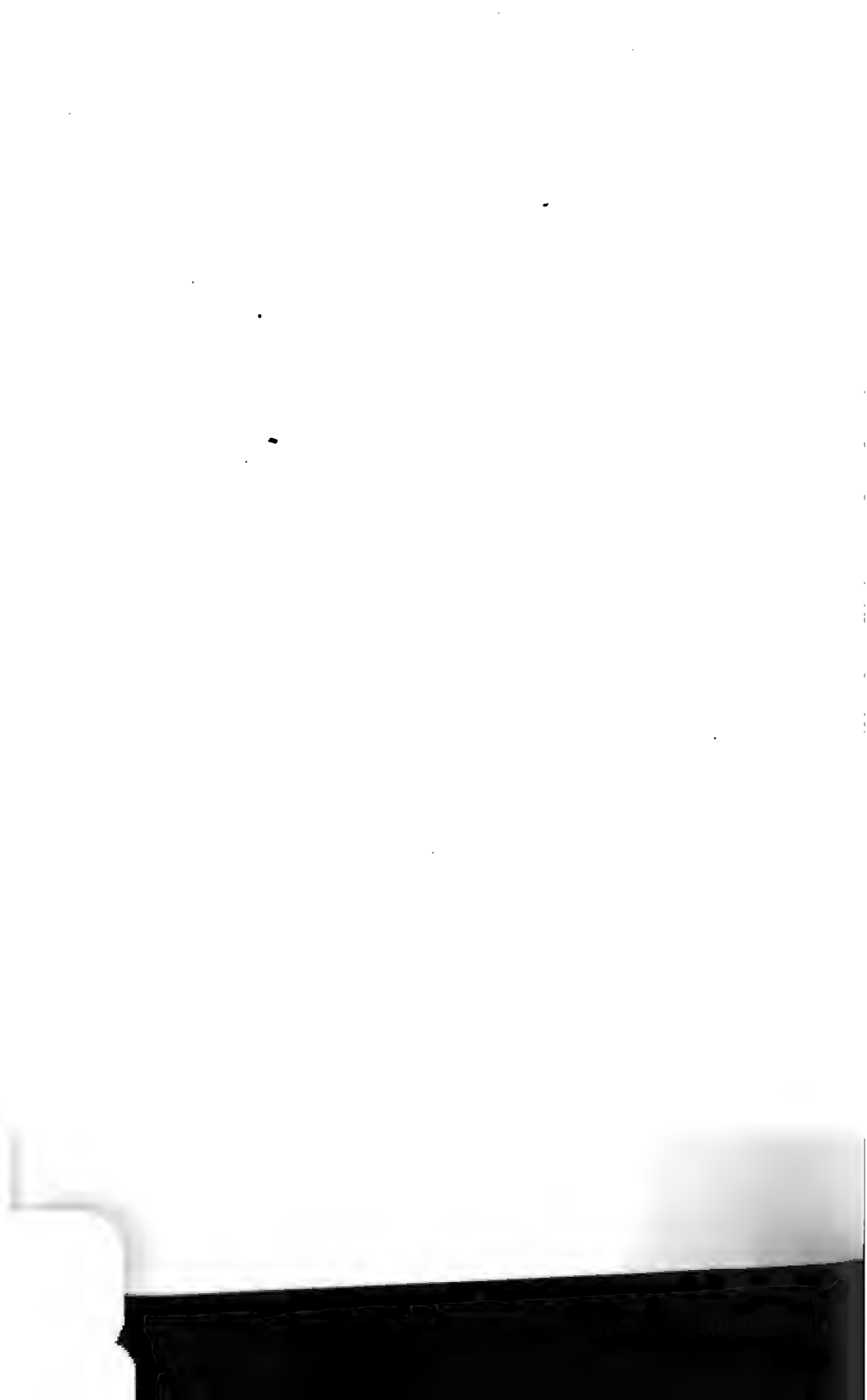
The "Field's Fruit-safe," for peaches, was next presented by

Mr. Savidge, of Spring Lake, and excited considerable attention and interest.

The following resolutions were adopted:

Resolved, That the Convention of Fruit-Growers, assembled at Spring Lake, recommend to the consideration of fruit-growers generally, the basket manufactured by the Grand Haven Fruit-basket Company, as combining great cheapness, with beauty of form, and as being well suited for the display and sale of fruit.

Resolved, That the Convention request Mr. John L. Edgar, of Wright, to furnish the Convention with samples of his Fruit-basket.



REGISTER OF
METEOROLOGICAL OBSERVATIONS

FOR THE YEAR 1868,

TAKEN AT THE

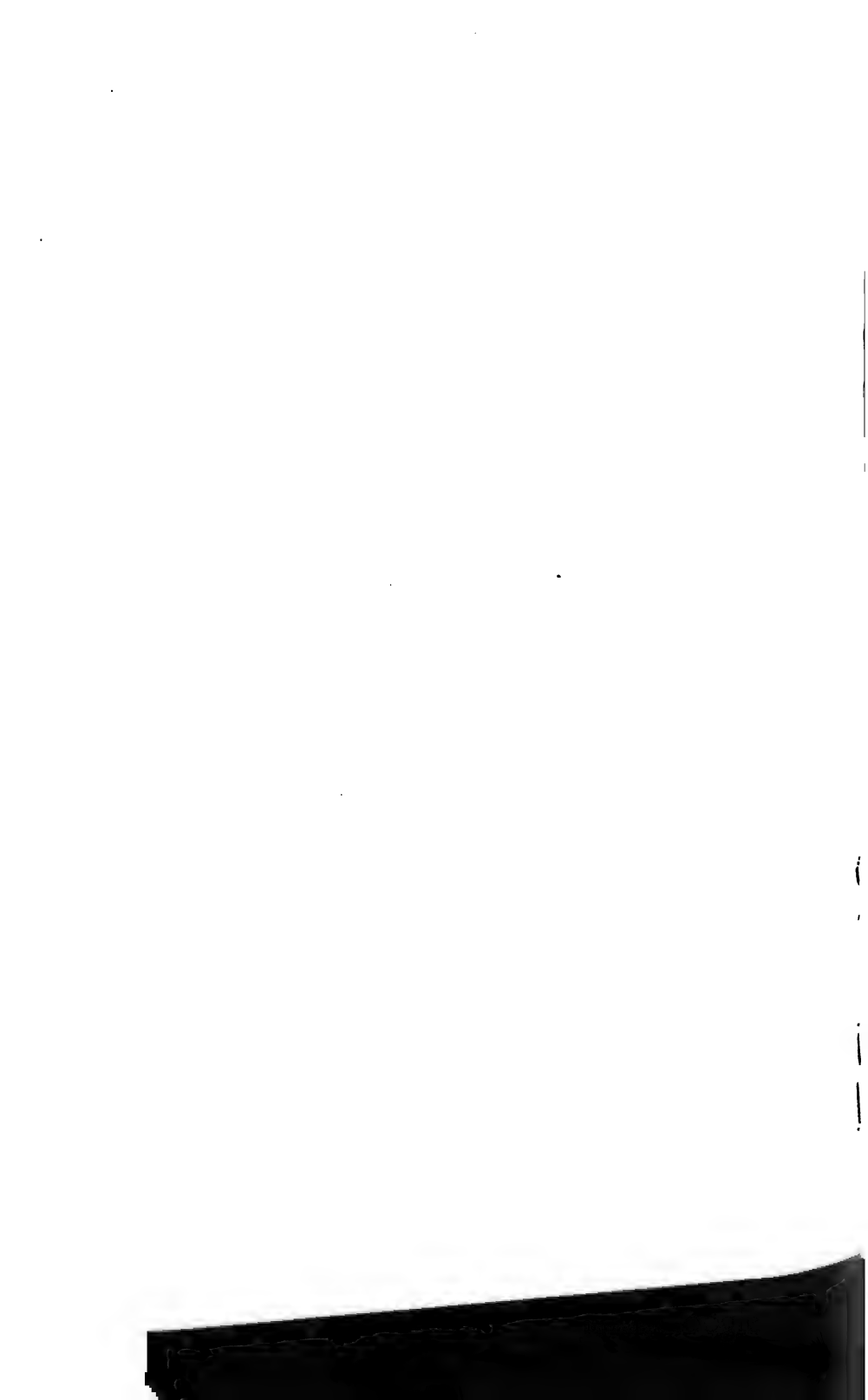
State Agricultural College of Michigan,

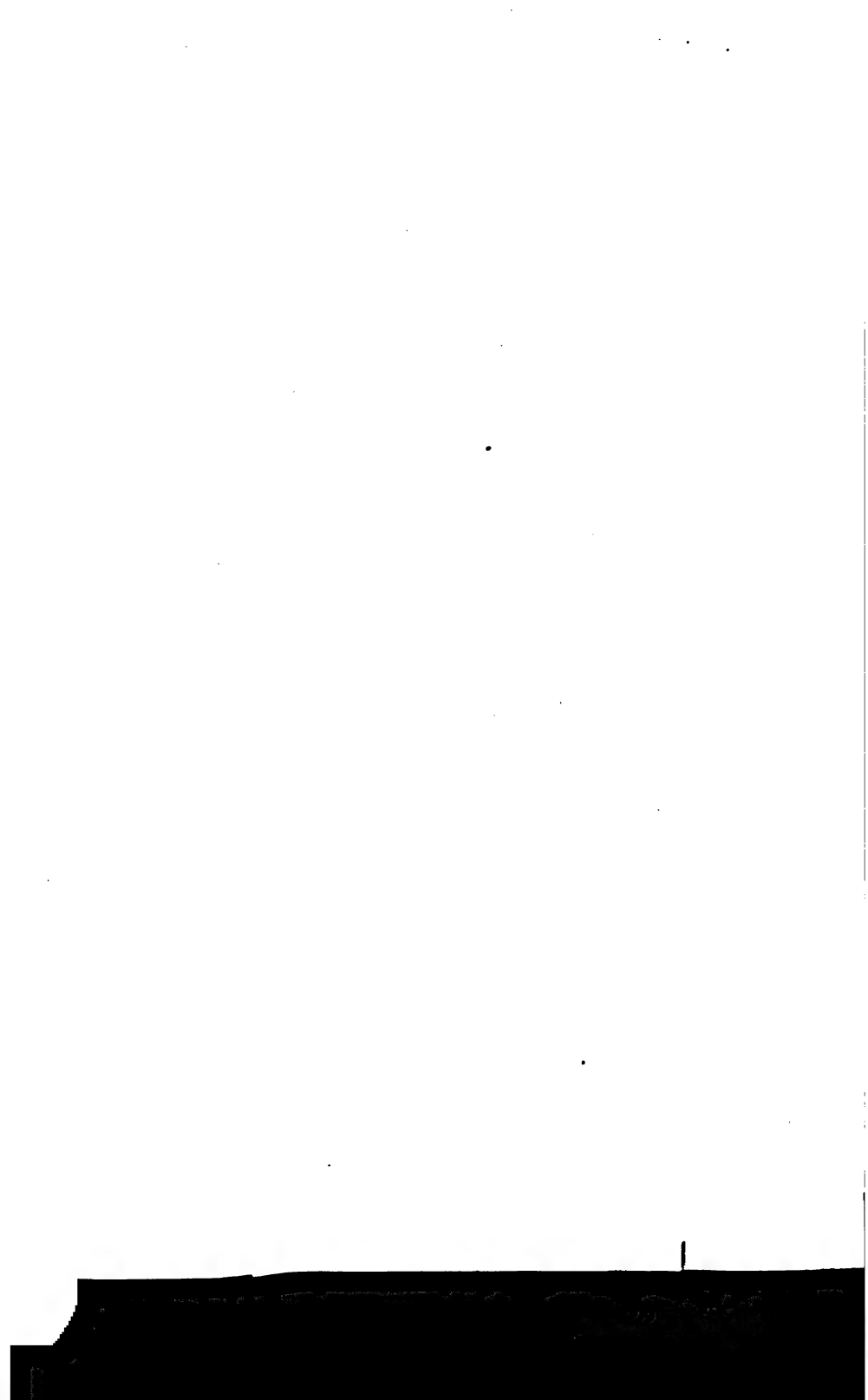
BY R. C. KEDZIE,

PROFESSOR OF CHEMISTRY.

LATITUDE $42^{\circ} 42' 24''$; LONGITUDE, $7^{\circ} 33' 19''$ WEST OF WASHINGTON.

Height above the Sea, 895 Feet.





Day of Month.	THE OFFER			BAROMETER HEIGHT REDUC'D TO FREEZING POINT.				FORCE OR PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	4 23 15	8		29.462	29.267	29.217	29.349	.052	.052	.070	100	44	82
2	21 15 8	7		29.054	29.255	29.405	29.238	.096	.055	.036	85	64	72
3	19 11 14	9		29.462	29.336	29.091	29.296	.019	.028	.051	100	39	63
4	19 23 10	2		29.142	29.200	29.097	29.146	.071	.089	.068	69	72	100
5	16 38 33			28.925	28.621	28.601	28.718	.074	.103	.168	83	45	39
6	14 19 10	2		28.681	28.851	29.041	28.858	.082	.087	.068	100	84	100
7	9 18 15			29.212	29.259	29.200	29.214	.029	.051	.070	100	52	82
8	15 30 32			29.091	28.748	28.477	28.784	.070	.093	.143	82	56	79
9	29 23 14			28.434	28.600	28.917	28.670	.142	.106	.082	88	88	100
10	14 18 4			29.172	29.227	29.167	29.189	.024	.093	.052	100	100	100
11	0 20 12			29.142	29.186	29.079	29.138	.044	.043	.075	100	40	100
12	15 37 28			29.174	29.162	28.954	28.097	.070	.066	.099	82	80	64
13	26 26 8			28.927	29.095	29.254	29.092	.103	.088	.062	75	62	100
14	-1 27 28			29.162	28.955	28.771	28.959	.042	.042	.117	100	29	76
15	27 82 26			28.754	28.929	29.051	28.911	.147	.162	.141	100	88	100
16	12 37 36			29.074	28.950	28.851	28.958	.060	.136	.191	80	62	90
17	36 37 22			28.685	28.892	29.120	28.892	.191	.116	.101	90	53	86
18	7 30 34			29.098	28.874	28.687	28.880	.045	.130	.138	76	78	71
19	21 41 32			28.791	28.860	28.841	28.831	.080	.147	.181	71	57	100
20	22 44 30			28.780	28.620	28.661	28.761	.118	.108	.167	100	37	100
21	25 19 12			28.844	29.044	29.106	28.998	.100	.103	.075	74	100	100
22	2 12 6			29.502	29.378	29.411	29.430	.048	.060	.067	100	80	100
23	5 8 9			29.428	29.375	29.251	29.351	.041	.062	.066	74	100	100
24	17 20 18			29.051	28.995	28.972	29.006	.078	.108	.098	83	100	100
25	19 27 25			29.092	29.147	29.198	29.146	.103	.147	.135	100	100	100
26	22 30 25			29.201	29.081	28.951	29.078	.118	.148	.135	100	89	100
27	23 32 23			28.768	28.746	28.761	28.758	.123	.143	.123	100	79	100
28	9 29 18			28.760	28.708	28.864	28.777	.065	.123	.096	100	77	100
29	16 28 23			28.917	28.886	28.837	28.880	.090	.099	.123	100	64	100
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31
Sums.
Means	29.014	.080	.096	.103	90	68	91
Average.....093	82



Day of Month.

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2 P. M.

Min.

7 A. M.

2 P. M.

9 P. M.

Mean.

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2 P. M.

9 P. M.

SATURATION.

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28.443

28.472

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.361

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29.046

29.100

29.060

29.065

.155</



	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
28.668	28.668	28.683	.848	.289	.439	86	56	88	
28.682	28.678	28.682	.188	.263	.148	100	82	89	
28.718	28.707	28.715	.168	.182	.136	89	73	73	
28.575	28.575	28.590	.167	.167	.113	100	100	100	
29.057	29.106	29.081	.094	.148	.073	100	79	59	
28.894	28.890	28.947	.088	.182	.188	82	73	100	
28.547	28.558	28.576	.181	.190	.148	100	74	89	
28.906	27.043	28.851	.141	.123	.073	100	77	59	
29.127	29.087	29.129	.096	.155	.111	85	75	79	
28.948	28.946	28.958	.111	.106	.108	75	86	83	
28.525	28.544	28.628	.178	.282	.300	81	73	100	
28.987	29.087	28.991	.195	.175	.111	82	89	75	
29.148	29.095	29.135	.111	.142	.199	75	51	90	
28.655	28.504	28.669	.178	.285	.321	81	85	86	
28.121	28.145	28.192	.456	.456	.418	88	88	100	
28.296	28.486	29.320	.265	.295	.311	92	73	190	
28.645	28.851	28.675	.199	.199	.143	74	90	79	
29.128	29.155	29.131	.178	.183	.241	81	47	84	
28.993	29.007	29.033	.199	.308	.309	90	74	85	
28.976	28.926	28.966	.298	.386	.348	92	67	93	
28.923	28.970	28.946	.258	.372	.420	71	62	94	
29.073	29.103	29.109	.164	.181	.173	59	43	73	
29.264	29.270	29.242	.174	.125	.169	100	40	65	
29.190	29.120	29.183	.143	.180	.212	43	37	100	
29.149	29.159	29.143	.238	.166	.273	77	36	85	
29.203	29.163	29.204	.155	.272	.218	34	44	50	
29.004	29.029	29.047	.218	.234	.439	50	32	88	
28.949	28.842	28.943	.308	.266	.282	74	34	58	
28.586	28.552	28.669	.300	.398	.423	100	56	88	
28.750	28.919	28.760	.350	.323	.272	75	65	78	
.....	
Sum	
Mean	28.911	.205	.229	.237	80	64	82	
Av	
.....	

9 P. M.

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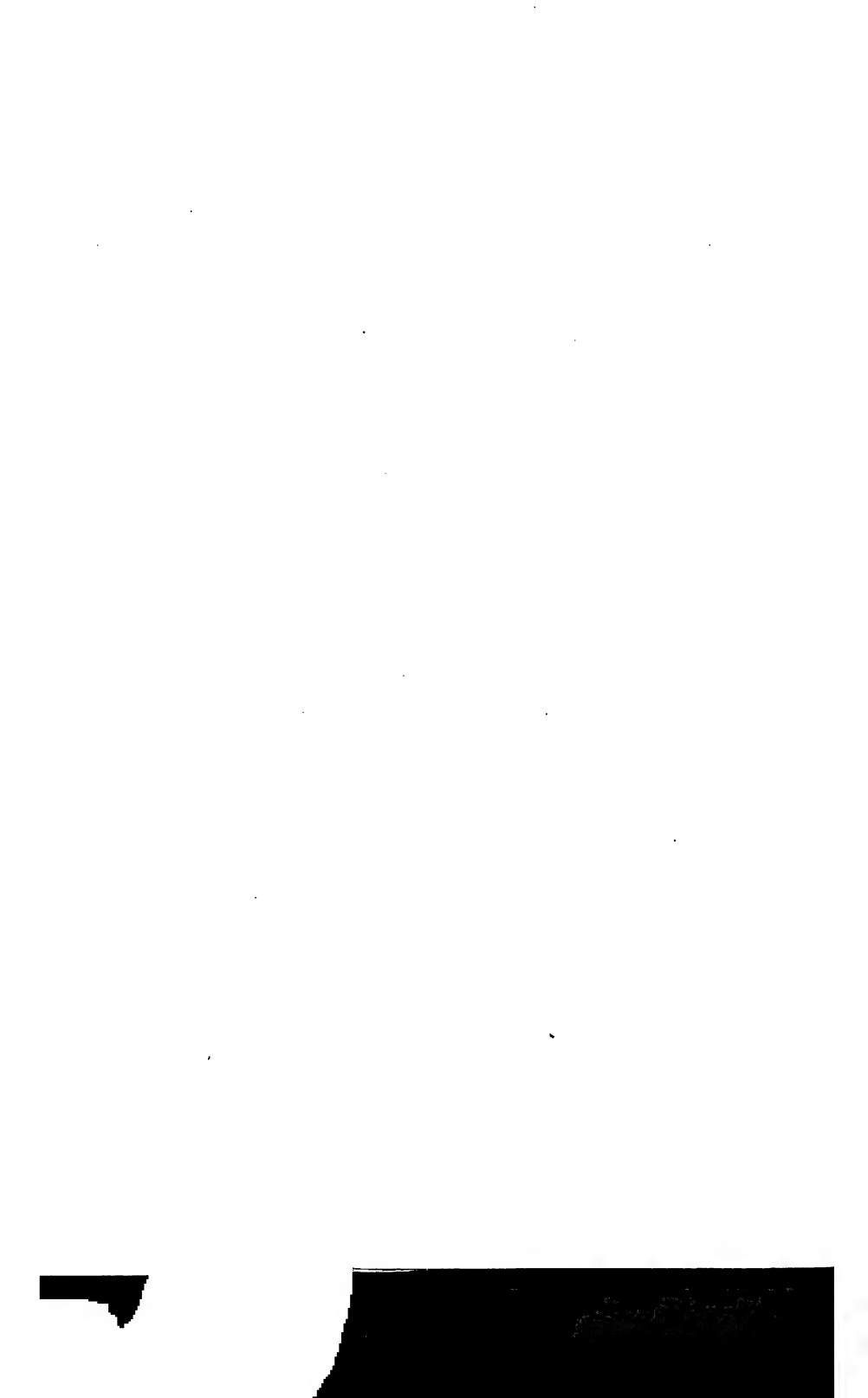
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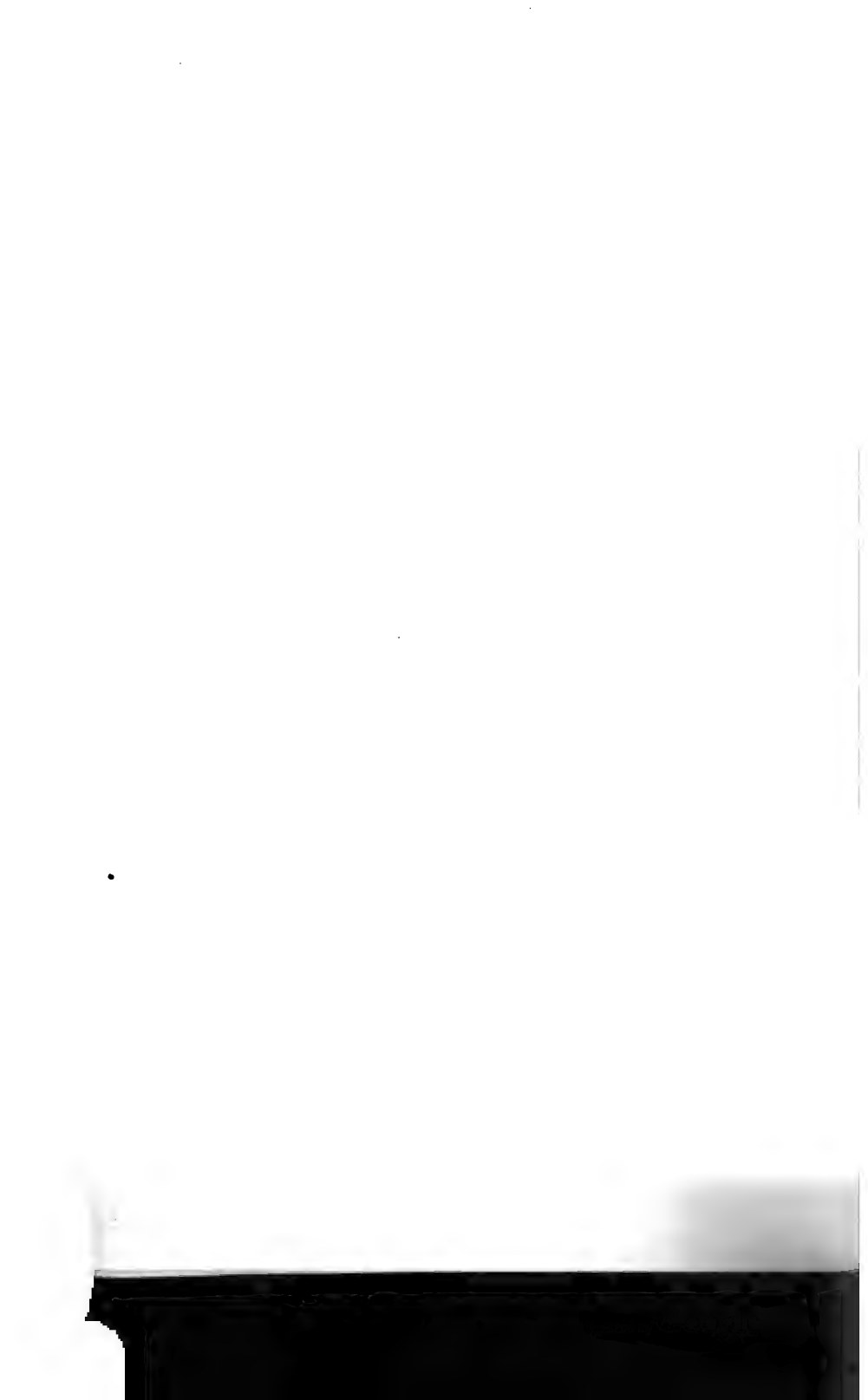


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Day of Month.	THERMOMETER			BAROMETER HEIGHT REDUCED TO FREEZING POINT.				FORCE OR PRESSURE OF VAPOR, IN INCHES.			OR PERCENTAGE OF SATURATION.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	36 44	34 34	33 34	28.925	28.995	29.078	28.999	.170	.180	.170	80	45	80
2	39 46	34 34	33 34	28.181	29.111	28.980	29.067	.160	.169	.162	100	54	80
3	37 58	44 34	33 34	28.840	28.886	28.779	28.818	.178	.255	.260	81	53	78
4	39 47	34 34	33 34	28.807	28.744	28.744	28.765	.216	.249	.175	91	77	89
5	40 37	34 34	33 34	28.876	29.072	29.172	29.086	.182	.199	.143	73	90	79
6	21 49	34 34	33 34	29.240	29.222	29.175	29.212	.096	.147	.155	85	57	89
7	39 51	34 34	33 34	29.046	28.885	28.966	28.969	.195	.296	.196	82	79	68
8	55 57	34 34	33 34	28.877	28.869	28.876	28.874	.433	.436	.273	100	94	85
9	42 48	34 34	33 34	28.984	28.919	28.851	28.894	.267	.278	.278	100	100	100
10	42 37	34 34	33 34	28.788	28.886	28.888	28.821	.244	.199	.175	91	90	90
11	28 37	34 34	33 34	28.878	28.944	29.066	28.969	.153	.178	.123	100	81	77
12	25 41	34 34	33 34	29.166	29.141	29.066	29.088	.185	.190	.170	100	74	80
13	35 56	34 34	33 34	29.116	29.119	29.160	29.132	.183	.282	.183	90	63	90
14	32 57	34 34	33 34	29.165	29.099	29.094	29.119	.181	.216	.236	100	46	70
15	40 52	34 34	33 34	29.117	29.106	29.117	29.114	.225	.232	.222	91	73	83
16	39 46	34 34	33 34	29.058	28.876	28.812	28.915	.162	.262	.249	63	84	77
17	41 30	34 34	33 34	28.517	28.580	28.620	28.569	.257	.167	.141	100	100	100
18	28 29	34 34	33 34	28.591	28.614	28.707	28.637	.123	.160	.123	100	100	100
19	17 32	34 34	33 34	28.768	28.774	28.761	28.764	.147	.181	.123	100	100	100
20	26 33	34 34	33 34	28.804	28.808	28.906	28.839	.141	.168	.167	100	89	100
21	30 32	34 34	33 34	28.931	29.077	29.070	29.026	.143	.162	.167	89	89	100
22	26 44	34 34	33 34	29.131	29.146	29.151	29.142	.088	.173	.188	62	60	100
22	22 49	34 34	33 34	29.161	29.159	29.146	29.155	.163	.312	.162	100	92	80
24	33 52	34 34	33 34	29.130	24.065	29.013	29.069	.168	.334	.199	89	86	90
25	37 42	34 34	33 34	28.744	28.680	28.596	28.656	.221	.167	.248	100	100	100
26	32 45	34 34	33 34	28.706	28.760	28.925	28.783	.143	.251	.148	79	84	89
27	16 50	34 34	33 34	29.018	29.959	28.898	28.958	.143	.309	.117	48	85	76
28	34 36	34 34	33 34	28.455	28.561	28.766	28.607	.196	.170	.148	100	80	79
29	29 46	34 34	33 34	28.766	28.515	28.463	28.581	.142	.212	.173	88	63	73
30	30 32	34 34	33 34	27.524	28.641	28.641	28.602	.143	.143	.363	89	79	53
31	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sums	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Means	...	...	...	.....	.....	.....	28.909	.175	.226	.177	88	79	85
Average	...	...	...	.....	.....	.....	.....	.192	.....	.....	84	.....	.....





APPENDIX.

APPENDIX.

THE TEXAS CATTLE-DISEASE.

To the President of the Michigan State Board of Agriculture:

In conformity with an appointment from you, the undersigned attended the Convention of Cattle Commissioners held at Springfield, Illinois, December 1st, 2d and 3d, 1868. Delegates were in attendance from the States of Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Missouri, New York, Ohio, Pennsylvania, Rhode Island, Wisconsin, and from the Province of Ontario.

The Convention was called for the purpose of considering a disease in cattle known as the Texas fever, or Texas cattle-disease. A large amount of evidence was brought forward, showing that cattle brought from Texas, and from the territory known as the Cherokee country, have in numerous instances communicated disease to other cattle in the States through which they have passed, or where they have been left to graze and fatten. In the States of Missouri and Illinois, great losses have been sustained from this cause, and in the State of New York various fatal cases have occurred which originated in Texas cattle sent to the eastern markets as beef.

The disease in question is of a peculiar character, and skillful veterinarians, both in Europe and this country, are unacquainted with it. Within a short time, however, the health officers of the city of New York and Chicago, and the cattle-commissioners of the State of New York, have made very im-

portant investigations respecting it, which, if properly followed up,—especially by thorough examinations in Texas, both in reference to the condition of the cattle there, and the nature and properties of the vegetation on which they feed,—may lead to a correct knowledge of the disease, and the best means of treating it.

It is unnecessary to go into details here in regard to the results of the investigations which have already been made. It is sufficient to say that the disease is characterized by a rapid disintegration of the blood, and the presence of microscopic spores of a fungus plant (*Tilletia caries*) in the blood and bile. The discovery of these spores seems to throw some light on the manner in which the disease is disseminated, as they are found not only in the fluids of animals that show marked symptoms of the disease, but also in the blood of Texan cattle that are otherwise apparently healthy. These facts are fully recorded in the authorized report of the proceedings of the Convention.

It is proper to say, however, that the danger of admitting Texas or Cherokee cattle to come into our region of country at any other season than when the temperature is so low as to prevent the spread of the disease, was obvious to every unprejudiced mind; and in view of protecting the different States against the introduction of this destructive malady, the Convention adopted the following propositions, to be submitted as the basis of legislative action:

ARTICLE I.

1. Provides for the appointment of three Commissioners, or such other number as may be necessary, by competent authority, to hold such office for five years, and report annually to the Legislature.

2. Such Commissioners shall have power to watch over the general welfare of animals within the State for which they are appointed, and particularly to prevent the spread of dangerous

diseases among them, and to protect the people of the State from the dangers arising from consumption of diseased meat.

3. They may from time to time appoint such Assistant Commissioners to aid them in the discharge of their duties, as the public good may require.

4. They should have power to administer oaths, and to prescribe from time to time such rules and regulations as may be necessary to accomplish the objects of their appointment.

5. They shall give public notice of the outbreak of any dangerous disease, and such practical directions for its avoidance as they may deem necessary.

6. They may either place such diseased cattle in quarantine or cause them to be killed, as may seem necessary for the public protection; but in the latter case they shall cause an appraisal of such cattle to be made, and the county or State shall pay such proportion of the appraised value as may be provided by law.

ARTICLE II.

1. The Commissioners, or any Assistant Commissioner, located on the frontier of any State, shall have power at such times as may be prescribed by the Commissioners, to inspect all the animals brought into such State, whether by railroad cars, vessels or common roads, and shall have power to detain such railroad cars, vessels and drovers, or animals on common roads, long enough to make a proper investigation of them, for the purpose of ascertaining their sanitary condition.

2. No animal shall be permitted to enter the State, which shall be deemed by such Assistant Commissioners to be capable of diffusing dangerous diseases, or injuring the health of the inhabitants; but an appeal shall be allowed to the Commissioners in all such cases.

3. No train shall be allowed to proceed unless the animals contained therein have been supplied with food, water, and rest, within 24 hours next preceding the time of such inspection.

4. All animals shall rest and have access to food and water for 24 hours, after having traveled a similar period.

5. The Railroad Companies shall provide suitable yards for feeding, watering, and resting the animals traveling on the trains, and for quarantine purposes; which shall be kept in cleanly and wholesome condition, to the satisfaction of the Commissioners.

6. Each train on leaving its point of departure, shall have certificates, signed by an Assistant Commissioner, which shall certify that all the animals therein contained were in a healthy condition at the time of its departure, and also the exact time of leaving; and such certificate and endorsements thereon of the time of resting and time of the departure of the train at subsequent resting and feeding places, shall be exhibited to the proper authorities whenever required.

7. Proper penalties should be inserted to prevent the bribery of officers charged with the execution of these provisions.

8. Proper penalties should also be provided for those who interfere with or resist the officers charged with the execution of these duties.

ARTICLE III.

WHEREAS, A malignant disease among cattle, known as Spanish fever, has been widely disseminated by the transit of Western cattle through the Western and North-western States during the warm season of the year, occasioning great loss to all farmers, and possibly endangering the health of our citizens; therefore,

Resolved, That this Convention earnestly recommend the enactment, by those States, of stringent laws to prevent the transit through their limits of Texas or Cherokee cattle, from the 1st day of March to the 1st day of November, inclusive.

Resolved, That the interests of the community require the enactment of laws making any person responsible for all damages that may result from the diffusion of any dangerous disease from animals in his ownership or possession.

Resolved, That all Texas and South-western cattle that have been ascertained to have been wintered in the States north of Texas, will be considered as native cattle.

Exposed as the State of Michigan is to the passage of Texas cattle through it on several lines of railroad, it is believed to be the part of prudence to guard, as far as practicable, against any injury from this cause occurring to our citizens. In this view, the attention of the Legislature was called to the subject, at its late session, and a law, a copy of which is herewith appended, was enacted.

M. MILES.

SANFORD HOWARD.

LAWS RELATING TO AGRICULTURE:

PASSED BY THE LEGISLATURE OF MICHIGAN, 1869.

AN ACT

To Prevent the Introduction of Contagious Diseases in Cattle.

SECTION 1. *The People of the State of Michigan enact*, That when the Governor of the State of Michigan shall be satisfied of the necessity of the same, he shall have power to appoint three commissioners, to hold their office for two years, and make report annually to the Secretary of the State Board of Agriculture. Such commissioner[s] shall have power to use means to prevent the spread of dangerous diseases among animals, and protect the people of the State from the dangers arising from the consumption of diseased meat. Said commissioners shall have power to administer oaths, and appoint assistants for such time as they may deem proper, and to place animals in quarantine, and to do generally whatever may be necessary to prevent the spread of contagious diseases among animals.

Sec. 2. No animal shall be permitted to enter or pass through this State, which shall be deemed by either of the commissioners capable of diffusing or communicating contagious diseases.

Sec. 3. No cattle brought from Texas or the Indian Territories, shall be permitted to pass through this State, or any part of the same, from the first day of March to the first day of November, in each year.

Sec. 4. This act shall take immediate effect.

Approved April 5, 1869.

AN ACT

To Regulate the size of Dry or Packing Barrels for Fruits, Roots, and Vegetables.

SECTION 1. *The People of the State of Michigan enact, That the quantity known as a barrel of fruit, roots, or vegetables, shall be two and one-half bushels, equivalent to sixty-eight hundred and seventy cubic inches.*

Approved March 8, 1869.

AN ACT

To amend an act entitled "An act to provide for the selection, care, and disposition of the lands donated to the State of Michigan, by act of Congress, approved July 2, 1862, for the endowment of Colleges for the benefit of Agriculture and the Mechanic Arts," approved March 18, 1863.

SECTION 1. *The People of the State of Michigan enact, That section three, of act number one hundred and forty, of the session laws of eighteen hundred and sixty-three, entitled "An act to provide for the selection, care, and disposition of the lands donated to the State of Michigan, by act of Congress, approved July 2d, 1862, for the endowment of colleges for the benefit of agriculture and the mechanic arts," approved March 18, 1863, be and the same is hereby amended so as to read as follows:*

Sec. 3. All of said lands, excepting as hereinafter provided, shall be sold for not less than three dollars per acre, one-fourth of the purchase price to be paid at the time of purchase, and the balance at any time thereafter, at the option of the purchaser, with interest on the unpaid balance at the rate of seven per cent. per annum, payable annually into the State treasury, in accordance with, and subject to all the terms and conditions of payment, and forfeitures for non-payment of all interest and taxes due thereon, as is now provided by the laws regulating the sale and forfeiture of primary school lands: *Provided, how-*

ever, That all of said lands which are valuable *principally* for the timber thereon, shall be sold for not less than five dollars per acre, the whole of the purchase money therefor to be paid at the date of purchase.

Sec. 2. This act shall take immediate effect.

Approved March 16, 1869.

AN ACT

To Prevent Trespass upon Cranberry Marshes.

SECTION 1. *The People of the State of Michigan enact*, That if any person shall enter the premises of any other person, and take and carry away cranberries or cranberry vines there growing, shall trample or otherwise injure or destroy the cranberry vines growing thereon, without the permission of the owner or occupant of said premises, such person shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be punished by imprisonment in the county jail not less than five days, or by fine not less than five dollars, and costs of prosecution, or both such fine and imprisonment, in the discretion of the court; and if any of the offenses mentioned in this section shall be committed on the first day of the week, or in disguise, or secretly in the night-time, between sun-setting and sun-rising, on conviction thereof the punishment shall not be less than twenty dollars fine, or imprisonment in the county jail not less than ten days, or both, at discretion of the court.

Sec. 2. Any person who shall commit any of the acts of trespass in section one of this act, shall be liable in treble damages, in an action of trespass to be brought in the name of the owner or occupant of the land upon which said trespass may have been committed.

Sec. 5. This act shall take immediate effect.

Approved March 17, 1869.

AN ACT

Authorizing the Locating, Establishing, and Constructing of Ditches, Drains, and Water-courses by Highway Commissioners of Townships, and repealing all acts relating thereto.

SECTION 1. *The People of the State of Michigan enact, That* when any persons in any township or townships shall agree upon the locating and constructing of any ditch, drain, or water-course, and shall enter into a written agreement, signed by all the persons along or across whose lands such ditch, drain or water-course is to run, specifying the place of beginning, the route and terminus, also the dimensions, and the number of feet or sections in length to be constructed by each person, and the compensation to be paid, if any agreed upon, and to whom, and by whom, and when to be paid, and a map shall be made, setting forth all of the above particulars, and the same, on being attached to the agreement, shall be presented to the commissioners of highways of any township, together with a sufficient amount of money to pay expenses incurred by such commissioners, they may examine and approve such proceedings, and endorse their approval thereon, and file the same in the town clerk's office of their township; and when such ditch, drain, or water-course shall extend into two or more townships, then duplicate copies shall be made and presented to the commissioners in each township, and be filed as above provided; and such ditch or drain shall be held to be fully established by law, and entitled to full protection from obstructions or damage.

Sec. 2. That before the commissioners of highways of any township shall take any steps towards locating, establishing or constructing any ditch, drain, or water-course, there shall be filed with such commissioners, or one of them, a petition signed by one or more persons, and where such proposed ditch, drain, or water-course shall run along, by, or across the lands of more than two persons, then such petition shall be signed by a majority of all the resident owners of lands so affected. Said pe-

tition shall set forth the necessities of the same, with a description of its starting point, route, and terminus, and such petitioners shall file with the commissioners of highways a good and sufficient bond with securities, at the time of filing said petition, conditioned to pay all costs and expenses incurred, in case such commissioners of highways shall fail or refuse to locate and establish such ditch, drain, or water-course. Upon such papers being filed, the commissioners of highways shall give notice in writing, by posting three written or printed notices along the route of such proposed ditch, drain, or water-course, and two in two of the most public places in the township, setting forth the time and place of meeting to determine such petitions, also the description of such proposed ditch, drain, or water-course, and its proposed route and terminus; and if any person owning lands sought to be affected by said proceedings be a non-resident of the county, a notice such as is contemplated by this section shall be given him by publication for two consecutive weeks in some newspaper of general circulation in the county, and such meeting of commissioners shall take place not less than five days after the last publication of such notice.

Sec. 3. Such commissioners, or a majority thereof, shall meet at the time and place appointed, and shall proceed to examine the route of such proposed ditch or water-course, and to determine the petition, and examine all applications for compensation for land to be used in constructing such ditch or water-course, and may call an engineer to their aid, and adjourn from time to time, not exceeding ten days at any one time, as the necessities of the case may require; and if they deem it advisable and beneficial, they shall proceed to locate and establish such ditch or water-course by staking the same off into sections of one hundred feet, commencing at the terminus, and they shall then set off and award a fair and equitable proportion of work to be performed in constructing such ditch or water-course, and the amount of fees and expenses to be paid by each one, and the amount to be paid for compensation, to

whom, and by whom, and when to be paid, and the time when such work shall be completed, and shall furnish each person interested with a statement setting forth the particulars as above specified: *Further*, They shall make, or cause to be made, a map of such ditch, drain, or water-course, designating the sections, and the distances and numbers of sections, or parts thereof, awarded to each one, and the starting point, route, and terminus thereof, which map shall be filed in the township clerk's office of the township.

Sec. 4. If such commissioners, on such examination and hearing, determine not to establish such ditch or water-course, then such petitioners shall, within five days thereafter, pay over to said commissioners, or one of them, all just and legal fees and expenses incurred in such proceeding, or be liable to have the same collected by civil process.

Sec. 5. If any person claiming compensation for land under this act, resident or non-resident of such county, shall fail to file such claim for compensation with the said commissioners, on or before the day set for hearing and determining the petition, he shall be held to have waived all right to appeal, and shall be barred from any claims or redress, either in law or equity: *Provided*, Said commissioners have complied with the conditions of this act: *And, further*, That the death of any party shall not work an abatement of proceedings in any case thereof.

Sec. 6. That if, on the day the commissioners announce their decision, or within ten days thereafter, any person who may have filed a claim for compensation, as before mentioned, shall refuse to abide by the same, or who may deem himself unjustly assessed, shall give notice to the commissioners, and demand an appraisement by a jury of twelve disinterested freeholders of the township, and at the same time he shall file with such commissioners a bond with two sureties, conditioned to pay all costs and expenses, provided he shall not recover or have such compensation increased, or assessment complained of changed to the amount of twenty-five dollars, by award of such jury,

and further, that he will abide by their decision, and waive all right to an appeal in the case; thereupon said commissioners shall file the notice demanding a jury, and the bond accompanying it, with some justice of the peace in the township, and direct said justice to impanel a jury of twelve disinterested freeholders, and set a day, within eight days, for a hearing in the case; and the party demanding such jury shall be notified by one of the commissioners of such meeting. On the day set for hearing, such jury shall be organized and sworn, as is usual in civil cases, and the person calling such jury, and the commissioners, shall have all the rights of plaintiff and defendant in such organization; and in examining witnesses, such justice shall hear and determine all questions and evidence offered to such jury, and shall direct them to visit and examine such ditch or water-course, and lands affected thereby, together with all or any claims for compensation, and render their verdict in writing, to such justice within three days thereafter. Said commissioners shall furnish the justice with a true copy of the map of such proposed drain or water-course, and a plat of all the lands affected thereby, to aid the jury in determining the case. Upon the rendering of the verdict of the jury, the justice shall certify the same to the commissioners, and order them to enforce and carry out the particulars contained in such verdict. The commissioners shall thereupon notify any person who may be affected by such verdict, by furnishing a statement similar to the one mentioned; and they shall file with the township clerk the order of such justice, together with the verdict, and a transcript of costs, which shall also be furnished. In case such jury shall fail to agree, the party calling for the same shall be entitled to another jury, or successive juries, upon paying all the costs incurred in each case before the impaneling of another jury; and in case he recovers as before provided, then the costs shall be taxed equitably upon all the lands affected by such ditch or water-course: *Provided*, That if the jury shall certify that the taking of such land is not necessary for the purpose of locating such ditch or water-course, then all proceedings shall be stayed

for twelve months, at the end of which time another jury may be demanded, if the parties interested desire it, and costs are paid as in former case: *Provided*, That all costs for services by having commissioners, justices of the peace, constables, jurors, and surveyors, in carrying out the provisions of this act, shall be the same as is provided by law in civil cases, as fees for such officers.

Sec. 7. That if on the day set for examination, it shall appear that any lands through which such proposed ditch, drain, or water-course may pass, belong to a non-resident, and he or they fail to appear, by themselves or otherwise, then such commissioners shall adjourn such examination a sufficient length of time, and shall cause some justice to impanel a jury, in the same manner as before provided in section six of this act, and shall direct such jury to view the premises; and in all manner the same proceedings shall be had as provided heretofore. Such justice shall certify their verdict and the costs to the commissioners, and they shall proceed as before directed, taxing the costs equitably in this case against all the lands.

Sec. 8. That at the expiration of the time given, if it shall appear that any of said work is not completed, then the commissioners may extend the time to the original contractor, or may give notices, in the same manner as is before required to be given to residents and non-residents in section two of this act, specifying a day when and where they will sell such work to the lowest responsible bidder, the same to take place at or near said ditch, and not less than five days after posting or publishing last notice, as the case may be.

Sec. 9. At the hour appointed, they shall proceed to sell such work to the lowest responsible bidder, in sections, and may reject any and all bids, if deemed exorbitant, and may adjourn such sale from time to time, as may become necessary to sell such work, as may seem to them just and equitable, not exceeding twenty days in all; also they shall furnish each purchaser of work, a description of the same, and the time in which it is to be completed, and shall require such purchaser

to sign a contract, with two good sureties, for the faithful performance of such work, and said commissioners shall file a record of their proceedings with the township clerk, as before provided.

Sec. 10. That if, on the first day of November after the letting of such work, as specified in section ten of this act, such apportionments for fees, costs, and compensation shall not have been collected, and the amount for which such work was sold shall not have been paid, then the commissioners of highways shall certify such amounts, or so much thereof as may be deemed necessary for the current year, to the supervisor of the township, specifying the piece or parcel of land by usual subdivisions, the amount to be assessed against each owner or piece thereof; and such supervisor shall enter the same upon his tax roll, in a column entitled "delinquent ditch-tax," to be levied and collected in the same manner as other taxes, and to be paid out by the treasurer, upon the order of the highway commissioners, to the persons entitled to receive the same.

Sec. 11. When the taxes so levied shall not be collected by the township treasurer, the land upon which they are levied shall be returned, advertised, and sold in the same manner as is provided for in other cases; and the county treasurer shall pay to the township treasurer all such taxes, as soon as collected, to be paid out as before provided.

Sec. 12. The power herein conferred upon commissioners of highways, shall extend to deepening, widening, and cleaning out any ditch, drain, or water-course that may have been established heretofore, or that may be hereafter established: *Provided*, The same requirements are followed out, as in locating and constructing ditches or water-courses under this act.

Sec. 13. That commissioners of highways shall have full power, and are required to prosecute, and recover before any justice of the peace in the township, not less than ten nor more than one hundred dollars and costs, as a penalty for willfully obstructing or damaging any ditch, drain, or water-course,

and to pay the same over to the township board, for the use of the school library fund in the township where the same was recovered.

Sec. 14. That where it is desired to extend a ditch, drain, or water-course into one or more townships, notice must be given, by filing with the commissioners of each township, a petition signed by a majority of residents affected thereby, in their respective townships, also a bond with two sureties, as before required; such petition must set forth, as nearly as may be, the starting point and terminus, also the route of such ditch or water-course. A day shall be agreed upon by the commissioners of all the towns interested, and the proper notices given, as provided in section two of this act.

Sec. 15. Upon the day set they shall meet at the place appointed, and if they agree to locate such ditch, and establish the starting point, route, and terminus, and the amount of expenses to be assessed by the commissioners of each township upon the resident owners affected therein, then the commissioners of each township shall proceed to locate, establish and construct such ditch, assess owners of land, and in all respects carry out the law as is required in locating ditches or water-courses in single townships: *Provided*, That the joint board of commissioners shall furnish a map of the ditch, together with a record of joint proceedings, to be filed in the township clerk's office in each township.

Sec. 16. That all laws or parts of laws authorizing the locating, establishing, or constructing of ditches, drains and water-courses, be and the same are hereby repealed, so far as the same relates to commissioners of highways in townships.

Approved March 17, 1869.

AN ACT

To provide for the draining of Swamps, Marshes, and other Low Lands.

SECTION 1. *The People of the State of Michigan enact, That* there may be one drain commissioner elected by the people in any organized county of this State; and if in such counties there shall be drain commissioners holding appointments under this act, the office of said commissioners shall cease when the said drain commissioner shall be duly elected and qualified, and shall have filed his bond, according to the provisions of this act.

Sec. 2. The first election of the county drain commissioner shall be held on the first Monday of April, one thousand eight hundred and sixty-nine, and every two years thereafter. The election provided for by this act shall be conducted, as near as may be, in the same manner and by the same officers, and the inspectors of election shall make the same canvass, statement, and returns as is provided by law for the election of a judge of the Supreme Court; and said drain commissioner shall be voted for on the same ballot as the judge aforesaid; and the board of county canvassers shall determine and declare the persons thus elected to the office of county drain commissioner.

Sec. 3. A certificate of election shall be immediately issued by the county board of canvassers to the person so elected to the office of county drain commissioner, who shall, within twenty days thereafter, take and subscribe the oath of office prescribed by the constitution of this State, and deposit the same with the county clerk, to be filed and preserved in his office, when it shall be the duty of said drain commissioner to execute to the county a bond, with two or more good and sufficient sureties, in such sum as the county treasurer and the sheriff of the county may require, and shall file said bond with the county clerk. He shall leave his post-office address with the county clerk, and shall enter upon the duties of his office

on the first day of May following, and shall preserve a record of his official acts in a book or books, to be furnished at the expense of the county, and delivered to his successor in office. Said commissioner shall file and preserve in his office, certified copies of all accounts against the drainage fund, and draw all orders on the drainage fund for the payment of such accounts. A vacancy in said office of drain commissioner may be filled by the judge of probate of said county.

Sec. 4. Upon application to him, in writing, of ten or more owners of land in each township in or through which they ask to have a drain constructed, for the construction of any drain or drains under this act, it shall be the duty of said commissioner to examine personally the swamp or low lands designated in such application, and if, in his opinion, such swamp or low lands should be drained, under his authority, he shall try to obtain a release of the right of way and other damages, from every person through whose land such drain or drains are to pass. If he obtain such release, he shall proceed to make such examination, by surveys or otherwise, as may be necessary to determine the route, width, length, and dimensions of any drain or drains required to be cut in any lands designated in such application, and the lands to be benefited thereby, and shall set division stakes at uniform distances, and not more than twenty rods apart, along the proposed line of every drain he decides to construct, and indicate distinctly on each stake, the number of the division from the place where such drain is to begin.

Sec. 5. If such release cannot be obtained in a reasonable time, said commissioner shall issue an order, under his hand, directed to the sheriff or any constable of said county, to write down the names of twenty-four freeholders, residents of said county, and not interested in the drain or drains in reference to which they are to act, and qualified to be jurors in the circuit court in said county. Such officer shall thereupon write down the names of twenty-four such persons, and give notice to said commissioner, and to such of the persons through whose lands

such drain or drains will run, as reside in the township or townships through or into which such drain or drains will pass, and can be found therein, that he will leave such names at the house of some justice of the peace in one of said townships, naming such justice, the place and time to be named in such notice, and the time, not less than four days from the time of giving such notice, and that at said place and time a jury will be struck from such list of names. At the time and place appointed, said commissioner shall strike off six names, and the person or persons interested in said drain or drains shall strike off a like number; and if either or both parties fail to strike off, such sheriff or constable shall do so for him or them, and the names remaining on such list shall form the jury; and thereupon said commissioner shall issue a *venire*, under his hand, directed to any constable, or the sheriff of said county, commanding him to summon said jury to be and appear before said commissioner, at a time and place to be named in said *venire*, to determine the necessity for the construction of any such drain or drains, and the amount of damage sustained by any person or persons owning or interested in any of the lands through which such drain or drains may be constructed. If the jury shall not all appear within one hour after the time of appearance named in said *venire*, said commissioner shall direct the officer to summon a sufficient number of competent jurors, as aforesaid, as talesmen, to complete the panel; and when the panel shall be full, said commissioner shall administer unto each juror an oath, well and truly to examine and determine the necessity for constructing said drain or drains, and to assess the damages sustained by any person or persons owning or interested in the lands through which the same shall pass. Said jury shall thereupon proceed to examine such swamp, marsh, or other low land, to determine the necessity for constructing such drain or drains, and if they shall, on a careful examination of the whole matter, be of the opinion that it is necessary to construct said drain or drains, they shall proceed to assess the damages which any person or persons shall sus-

tain by reason of the construction of the same, and shall certify, in writing, their doings, and the amount of damages so assessed, to said commissioner; and said jurors shall each be entitled to receive one dollar per day, and six cents per mile for traveling, in going to the place or places where such drain or drains shall be located, to be paid according to the provisions of this act.

Sec. 6. Said commissioner may, instead of calling a jury as provided in section five of this act, apply to a court of record having jurisdiction in said county, for the appointment of three special commissioners to examine such swamp, marsh, or other low land, and determine the necessity for the construction of any drain or drains therein, and the amount of damages that any person or persons will sustain thereby. It shall be the duty of said court of record, on such application, to appoint such special commissioners, and deliver to said drain commissioner a certificate of the appointment of said commissioner, and the commissioners so appointed shall determine the necessity for constructing any drain or drains so applied for, and assess the damages to which any person or persons shall be entitled by reason of the construction thereof, in the same manner and under the same restrictions imposed on a jury of freeholders in section five of this act, and shall certify in writing, their determination to said drain commissioner.

Sec. 7. If at this or at any prior stage of the proceedings, all the owners of the lands through which such drain or drains are located shall, by themselves, their agents, or attorneys, pay to said commissioner all the costs and expenses thus far incurred by him, and severally enter into contract with said commissioner, with good and sufficient surety, and in such sum as said commissioner may require, to construct so much of said drain, and on such route, and of such dimensions as said commissioner may in said contracts determine and assign to said owners respectively, and the expenses to be incurred in accepting said contracts or otherwise, and collection in case of non-fulfillment, then said commissioner may so contract with said

owners; and such drain, when so finished and accepted, shall be recorded by said commissioner as a drain lawfully constructed, in pursuance of the provisions of this act. If any of said contracts are not fulfilled by the time limited therein, said commissioner may prosecute the same to final settlement and collection, with all lawful costs and expenses attending such collection.

Sec. 8. If all the owners of lands through which such drain or drains are located shall not pay the expenses incurred, and contract to build such drain or drains, as provided in section seven of this act, said commissioner shall make, or cause to be made, maps of said lands, designating thereon the length, depth, width, position, and direction of every ditch or drain by him laid out and established, also the number of acres of every section or part of section of lands to be benefited by said ditches or drains, and shall estimate and assign the construction of an equitable part or parts of such drain or drains to each parcel of land to be so benefited, describing such parts of drains by said division stakes, and stakes subdividing such divisions, if need be. And where such drain or drains will benefit highways, said commissioner shall estimate also the amount of such benefit, and assign the same to the township to which such highway belongs. He shall also make an estimate of the sum necessary to be raised to pay the incidental expenses of making such ditches or drains, and for damages, if any, and the portion thereof that ought to be assessed on each parcel, section or part of section of land to be benefited thereby, and the amount to be raised in each township for such incidental expenses and damages. The incidental expenses, damages, and expense of construction of drains shall be assessed on the several parcels of lands benefited or injured, in proportion to the benefit or injury to accrue to each such parcel of land from such drains: *Provided*, That no assessment shall be levied on the lands not actually benefited.

Sec. 9. Said commissioner shall give at least fifteen days' public notice in some newspaper published and circulating near

such drain or drains, of the time or times when, and the place or places where he will meet parties to contract for the excavation and construction of such drain or drains, such place or places to be convenient of access by the people resident near and interested in the proposed drain or drains; and at least three such notices shall also be posted in the most public places of travel and resort in each township, and, as near as may be, along the line of such proposed drain, at least ten days next preceding such meeting. Said commissioner shall also name in or in connection with such published and such posted notices a convenient place near such drain or drains, and a time not less than three days, nor more than five days prior to the day fixed in said notices for letting the construction of such drain or drains, at which place and time he will exhibit maps of the proposed drain or drains, and descriptions of the several parcels of land by him deemed to be benefited thereby, and the amount and description, by divisions and subdivisions, of the proposed drain or drains by him apportioned to the owner of each description of land to construct, and to each township to construct on account of such drains benefiting highways, if any such benefit there be, and hear reasons, if any are offered, why such apportionments should be reviewed and corrected. And if at this time two-thirds of the persons whose lands are to be taxed for such drain or drains enter a protest against said drain, and pay the costs and expenses up to this time, all proceedings for the construction of said drain or drains shall be suspended for one year. Between such day of hearing and review and the appointed day of letting, the commissioner shall, if need be, revise and correct his apportionments of such drain or drains. At the time and place for letting named in said notices, the owner of each such parcel of land, or his or her agent or attorney, may appear, and make and execute to said commissioner a contract or contracts, with good and sufficient surety, for the faithful performance of the excavation and construction within the time limited by said commissioner in such contract or contracts, of so much of such drain or drains as said commis-

sioner has adjudged or set off to such land. When any part of such drain or drains is offered to be let, and the owner of the land to which it is assigned, or his or her agent or attorney, shall not at once and without unnecessary delay, enter into contract as aforesaid, to excavate and construct the same, as provided in this section, it shall be the duty of said commissioner to let the same to the lowest responsible bidder or bidders therefor, who shall execute and file a contract or contracts, with good and sufficient surety as aforesaid, with said commissioner, for the faithful performance of the excavation and construction of the same, according to said contract or contracts; and the cost of such excavation and construction, and its portion of the incidental expenses and damages, shall be levied and assessed upon the land to which such part or parts of said drain or drains have been assigned, as aforesaid. If at the time of letting said drain or drains, according to said notice, no suitable land-owners or bidders for the construction of the same, or any part thereof, appear to take or bid and contract, with good and sufficient surety, for the construction and completion of the whole of the same, or for any other cause, by said drain commissioner deemed important and sufficient, he may postpone and adjourn such letting, in whole or in part, and from time to time, to such other time or times, to be by him, at the time of such adjournment, publicly announced, as shall to him seem meet and proper, but not in all for more than thirty days from and after the time of the letting at first advertised and noticed as aforesaid. At the hearing and the letting provided for in this section, one or more of the commissioners of highways of any township named in said notice, and to which has been assigned any construction of drain, or tax for incidental expenses, or damages on account of benefit by such drain or drains to highways, may appear and act in behalf of such township. Any taxes so assessed on State lands shall be at once reported by said commissioner to the Commissioner of the State Land Office, who shall enter on the books of his office against each description of such State land, the amount of drain taxes

assessed thereon; and no patent shall issue for such lands until said drain taxes are paid or otherwise provided for. Any person, resident in said county, failing or neglecting to file, in writing, with said commissioner on or before such appointed day of hearing and review, his claim for damages, or objections to such assessments, shall be held to have waived his claim for damages, and his right to appeal.

Sec. 10. When any part or parts of such drain or drains are not finished within the time limited by contract, said drain commissioner may, in his discretion, at any time thereafter, extend such contract or contracts, or re-let such unfinished drain or drains, or any part thereof, by public sale or otherwise, after not less than five days' notice thereof, to the lowest responsible bidder or bidders, and shall take security, as before. The cost of completing such parts, and the expense of notices and re-letting shall be collected by said commissioner, of the parties at first contracting to construct the same, or partly collected of such parties, and partly assessed on the lands to which the construction of such parts was assigned, as may be deemed just and equitable; and said commissioner shall see and provide that the finished portions of any drain by him laid out, established and constructed, shall have free outlet, as far as may be, within the limits of his jurisdiction.

Sec. 11. Said commissioner shall make a full report of all his doings in the premises, accompanied with maps, and with surveys if necessary, and all other matters needful to a full exhibition of his action on such drain, and present the same to the board of supervisors at their next annual meeting, using such blanks and forms as may be necessary for this purpose; and the board of supervisors shall, at said meeting, charge the aggregate sums as they are so apportioned, against the proper townships, and direct the supervisor of each township in which any portion of said drain or drains may be ordered to be constructed, or tax levied, to levy the same upon the several parcels of land described in said report of his township, according to the apportionment of said commissioner, and direct the town-

ship treasurer to collect and pay said sums to the county treasurer, in like manner, and at the same time with other taxes: *Provided*, Said report and apportionment shall contain a description and assessment of all lands through which such drain or drains may run, or which in his opinion are actually benefited thereby; he shall also file a copy of said report with the county treasurer, after the levy of such tax by the board of supervisors.

Sec. 12. It shall be the duty of the county treasurer to return all lands upon which a tax shall be levied under this act, delinquent for such tax, to the Auditor General, and the same shall be advertised and sold therefor, at the same time, and in the same manner, and subject to the like redemption as lands delinquent for other taxes. In case any lands belonging to individuals charged with a drain tax shall be bid off to the State, or sold to other parties, at the tax sales, the State Treasurer shall pay over to the proper county treasurer the amount of such drain taxes.

Sec. 13. Said commissioner shall have power to re-locate any drain or drains, and to alter or vary the size, or extend the line thereof, with the consent of the contractor or contractors, if such extension be necessary to provide a suitable outlet; and the power herein conferred on said commissioner, for digging and draining, shall also extend to and include deepening and widening, and clearing out any ditches or drains which have heretofore been or may hereafter be constructed; also straightening, cleaning out, and deepening the channels of creeks and streams; but no expense exceeding twenty-five dollars on any one drain or creek shall be charged and assessed as aforesaid, unless upon such application as provided for in section four of this act.

Sec. 14. Drains may be laid along, within the limits of, or across any public road; and where any shall be so laid out and constructed, or where any road shall hereafter be constructed along or across any such drain, it shall be the duty of the overseers of highways in their respective districts to keep such

drain open and free from all obstructions; and when any such drain shall cross a public highway, the overseers of the proper district shall build and keep in repair a suitable bridge over the same. And the township to which any road along or across which any drain has been made belongs, shall pay towards the construction of such drain, such sum as the drainage commissioner shall estimate as aforesaid as the benefit accruing to such road from such drain. A drain may be laid along any railroad when necessary, but not to the injury of such road; and when it shall be necessary to run a drain across a railroad, it shall be the duty of such railroad company, when notified by said drain commissioner to do so, to make the necessary opening through said road, and to build and keep in repair a suitable culvert.

Sec. 15. Whenever any tax levied for the construction of a drain under this act shall be reported back by the Auditor General to the county treasurer where the same was levied, or shall be set aside by any court of competent jurisdiction, it shall be lawful for the supervisor of the proper township to re-assess such tax on the same land where such drain has been made. And it shall also be competent for the board of supervisors, upon the recommendation of the drainage commissioner, or upon a review before them, had by appeal from the action or decision of the drain commissioner, to re-assess upon the various lands, or portions of land, sections, or parts of sections of land by him deemed to be benefited or damaged by any drain or drains, such amount or amounts of drainage taxes, to be assessed, levied and collected as other State and county taxes are assessed, levied, and collected, as may be by them deemed necessary to correct any mistake or misapportionment of drain, or of taxes for the construction of the same by the drainage commissioner: *Provided*, Such appeal or review be brought before said county supervisors within one year from the time of such alleged mistake or misapportionment on the part of the said drainage commissioner, or by appeal as hereinafter provided.

Sec. 16. If any person shall willfully or maliciously remove any division stake set along the line of any drain laid out by and under the provisions of this act, or obstruct or injure any such drain, he shall, for each and every such offense, be subject to a fine not exceeding ten dollars, together with such sum as will be required to repair such damage, and costs of suit, which fine may be recovered in an action of debt, at the suit of said commissioner, before any justice of the peace of the proper county; and whenever recovery shall be made, and the same collected, it shall be deposited with the county treasurer for the benefit of the library fund of the township in which such drain is located.

Sec. 17. No money shall be paid by any county treasurer of any county in which a tax is assessed for the purpose of drainage, under this act, or [on] any warrant drawn by said commissioner, out of any other fund than that derived from such taxes, unless by express order of the board of supervisors.

Sec. 18. The commissioner shall be entitled to receive not to exceed four dollars per day, for the time actually spent by him in performing his duties under this act, which shall be in full for time and personal expenses, to be audited by the board of supervisors, and paid out of the moneys collected by virtue of this act, or otherwise, as the board of supervisors may order.

Sec. 19. Whenever any order drawn by the commissioner shall be presented to the county treasurer, and there shall be no funds in his hands applicable to the payment thereof, the county treasurer shall endorse thereon the date of such presentation, with his signature thereto. Such orders shall draw interest from and after such presentation and endorsement.

Sec. 20. Whenever it shall be deemed necessary to run a drain across any county line, the application for such drain shall be addressed to the commissioners of both counties, and the same proceedings shall be had, as near as may be, as are required on the application to the commissioner of one county, and they shall both act as one board of commissioners; and the board thus formed shall report to both county treasurers,

boards of supervisors, and the Auditor General, as hereinbefore provided when the drain lies in one county.

Sec. 21. An appeal shall lie from the decision of said commissioner to a jury of six disinterested freeholders, on due application to a justice of the peace in and for the proper county, within ten days after such decision, and from the award of such jury to the board of county supervisors, by notice filed with the county clerk, within ten days after such award is rendered: *Provided*, The appellants shall, in all cases, before taking such appeal, give security for costs, with one or more sureties, to the satisfaction of the justice before whom such appeal is taken; and a review, simply to correct mistakes, or errors in fact, may in like manner be had before the board of county supervisors, at any time within one year after such mistake has been made by said drain commissioner: *And provided further*, That said appeal shall not stop the construction of any drain.

Sec. 22. All bids made for any of the lands which may be sold for taxes assessed under the provisions of this act may be paid in warrants, drawn under the provisions of this act by the commissioner, on the treasurer of said county in which the lands are situated, if drawn for the construction of drains, incidental expenses, or commissioner's services, for which said lands are to be sold; and such warrant shall, if tendered, be received by the Auditor General, or treasurer of the county in which they were drawn, in payment for any such tax that may be returned delinquent.

Sec. 23. For the information of all persons concerned, the said commissioner shall make a full report, in writing, to the board of supervisors of the proper county, at the next and each annual session thereafter, setting forth as nearly as practicable:

First. What proportion of the ditches or drains, for the construction of which a tax has been levied, is completed, and the amount paid therefor;

Second. What proportion is under contract and not completed, and the amount to be paid therefor, and whether such

contract or contracts are likely to be performed; also the proportion not yet under contract, and the estimated cost of their construction, and whether there is a sufficient amount of unexpended funds, created by such tax, to complete the work;

Third. What amount of such funds has been expended, and for what purpose, exhibiting the items of such expenditures as fully as may be practicable; and also, what amount of warrants has been drawn by him against such fund, and shall also report all such other matters in relation to the subject as he may deem necessary, or said board of supervisors may require.

Sec. 24. The board of supervisors of each county in which a commissioner shall be elected shall have full power and authority to control the action of such commissioner, and may order a re-assessment of the drain tax, or any portion thereof, to correct errors, as provided in section fifteen of this act, and may make any other order in relation to such ditches or drains, or other matters relating thereto, not inconsistent with the public interests or the rights of individuals, which order shall be binding on such commissioner; they shall also have power to remove such commissioner for cause deemed by them sufficient.

Sec. 25. Said commissioner shall issue his order upon the county treasurer for the amount of such damages as may be allowed to any person or persons, their agent or attorney, by reason of the construction of any drain or drains, under this act; such order or orders shall be paid by said treasurer out of any moneys in the treasury, in pursuance of the provisions of this act.

Sec. 26. Whenever application shall be made as provided in the fourth section of this act, to said commissioner to examine any swamp, marsh, or other low land, and said commissioner shall proceed to examine the same, and it appears, on such examination, that there was not sufficient cause for making such application, and the commissioner shall so determine that no ditch or ditches asked for by said applicants is needed, said applicants shall be liable to said commissioner for the amount of all costs and expenses incurred by him in making such

determination; and if said applicants shall neglect to pay the same on demand thereof being made, said commissioner may recover the same in an action of assumpsit, or on the case, before any justice of said county.

Sec. 27. Any person or persons who shall be taxed for the construction of any drain or drains, constructed in accordance with the provisions of this act, whose lands shall not be situated on the line of said drain, shall have the right, and it shall be lawful for such person or persons to construct, dig, and excavate a drain and keep the same open, in any water-course leading from such lands into said drain, across the lands of any person or persons lying between said lands so taxed and said drain, at proper seasons of the year, and causing as little damage as possible to the owner or occupant of the lands through which such drains may be constructed.

Sec. 28. Whenever any drain shall be laid along or near the boundary line of any city or village, under the provisions of this act, and any lands within said city or village shall be benefited thereby, the said commissioner shall make an estimate of the sum that ought to be levied on each parcel of land so benefited, in the same manner, and the same proceedings shall be thereupon had, as if said lands had been included within a township; and whenever said commissioner shall find it necessary, he may, with the consent of the common council or trustees, lay and construct any drain, partly in a township and partly in a city or village; and may, in like manner, estimate the sums that ought to be levied on any parcel of land within such city or village, that shall be benefited by such drain, and the same proceedings shall be thereupon had, and the sums collected in the same manner, as if said lands were situated in a township.

Sec. 29. It shall be the duty of every person owning land across which a drain has been or may be lawfully constructed by the county drain commissioner, to keep so much of such drain as lies upon his lands, open and in good repair. If such owner shall refuse or neglect to keep such drain open and in

good repair, it shall be lawful, and the duty of said commissioner, on application to him, in writing, of five freeholders, resident near the obstructed parts of such drain, to open and repair the same, and the costs and expenses of such repairs shall be collected by said commissioner of such delinquent owner; or, such costs and expenses, with one year's interest on the same, may be reported to the board of supervisors, who shall order the same to be assessed by the supervisor of the proper township, on the real and personal estate of said delinquent owner, and the same shall be collected and paid over to the county treasurer, and passed to the drainage fund of said county: *Provided*, That if such expenses shall exceed ten dollars, the same application and proceedings shall be had as in section four of this act.

Sec. 30. All commissioners appointed according to the provisions of an act entitled "An act to provide for the draining of swamps, marshes, and other low lands," approved March fifteenth, eighteen hundred and sixty-one, and the several acts amendatory thereto, viz: Act number two hundred and forty, laws of eighteen hundred and sixty-five, approved March eighteenth, eighteen hundred and sixty-five; act number four, laws of eighteen hundred and sixty-seven, approved February fifth, eighteen hundred and sixty-seven; act number one hundred and twenty-seven, laws of eighteen hundred and sixty-seven, approved March twenty-seventh, eighteen hundred and sixty-seven, and act one hundred and forty-nine, laws of eighteen hundred and sixty-seven, approved March twenty-seventh, eighteen hundred and sixty-seven, and who are holding such offices at the time of the passage of this act, shall continue to hold such office, with all the powers, and subject to the provisions of this act, until they shall resign or be removed by the board of supervisors of the proper county, or until a drain commissioner shall be elected and qualified, and has filed his bond as provided in this act; and thereupon they shall deliver to said commissioner all books, papers, moneys accounts, or other property belonging to said office. Any action or suits

begun under said acts, shall continue and be determined under and according to this act; and said commissioners, or said elected commissioner, may alter or vary the route, and rescind any contract entered into for the construction of any drain, for any cause which, in their opinion, or his opinion, may be sufficient; and upon such alteration or variation of route, or rescission of contract, may proceed to the completion of such drain or drains under the provisions of this act; and it is provided that anything contained in this act shall not be construed or held to annul or avoid any assessment, contract, or undertaking heretofore made, levied, or entered into by the commissioners of any county, under the said acts, which are by this act repealed, save as in this section provided; and all rights which may have accrued, and all acts done by such commissioners, shall remain unimpaired by anything herein contained, save as provided in this section.

Sec. 31. The board of supervisors in any organized county of this State, not having a drain commissioner elected and qualified, and his bond filed according to the provisions of this act, may, at their annual meeting in the year eighteen hundred and sixty-nine, recommend in writing to a court of record in and for said county, three or more electors and inhabitants of said county, and not supervisors, to be known as drainage commissioners of such county; and said court of record, if it approve the persons so recommended, shall certify severally the appointment of three of them, on such recommendation, as said drainage commissioners; certificates of such appointments shall be filed with the county clerk. But said court of record may reject any of the persons so recommended, as unsuitable or unqualified for said office, and upon like recommendation, or upon petition of twenty resident freeholders, shall appoint other discreet freeholders, electors and residents in said county, to complete the said number of three such drainage commissioners, and certify such appointment to the county clerk as aforesaid. One of said commissioners shall be appointed for the term of one year, one for the term of two years, and one

for the term of three years, each to hold his office until another shall be appointed in his place and duly qualified; and at their annual session in each year thereafter, the board of supervisors may recommend, and the court appoint one commissioner for three years, and until his successor is chosen and qualified. In case of the neglect or refusal of the board of supervisors of any such organized county so to recommend, and a court of record to appoint such commissioners, it shall be obligatory upon such board and such court to make such recommendation and appointment, upon presentation to them of a petition signed by fifty resident freeholders of the county, praying that such commissioners be appointed. Before entering upon their duties as commissioners, they shall severally make oath, before some person duly authorized to administer oaths, that they will justly, faithfully, and impartially discharge their duties as such drain commissioners, which oath shall be by them filed in the county clerk's office, and they shall thereupon choose one of their number as chairman and one as clerk, which shall constitute them an organized board of commissioners. Every chairman and clerk of such board of commissioners shall, within ten days after he is chosen as such, and before entering upon the duties of his office, file in the office of the county clerk a bond to the county, with two or more good and sufficient sureties, in a penal sum of not less than two thousand dollars, and more, if the board of supervisors shall so order, for the faithful and impartial performance of his duties as such chairman or clerk, respectively, and for the disbursement of the drainage fund, according to law; and the county clerk shall, before filing said bond in his office, certify on said bond his approval of the said bond and its sureties. Said commissioners shall have power, and it shall be their duty, on application, as provided in this act, to lay out, establish, and cause to be constructed such ditches and drains, and to clear out, straighten, and deepen such streams and water-courses as they may deem necessary for the public health, and to assess the damages, if

any are allowed by them, to which any person or persons shall be entitled by reason thereof. All orders on the drainage fund shall be drawn by the clerk and countersigned by the chairman of said board of drain commissioners; and the clerk of said board shall record in a book or books, to be provided by the county for that purpose, the proceedings of said commissioners, and shall file and preserve in his office all papers pertaining thereto, and deliver the same to his successor in office. Vacancies in said board of drain commissioners may be filled by a court of record in and for said county, on application, in writing, of the remaining members of said board and the sheriff of the county; appointments so made to fill vacancies shall be valid only till the next annual meeting of the board of supervisors. The three drain commissioners appointed and qualified according to this section, shall have power to lay out and construct drains, and assess damages, and to perform all other duties authorized to be done by the one drain commissioner and the jury, or the three special commissioners, as provided in the preceding sections of this act; and on application of ten or more owners of land in each township in which they ask to have a drain constructed, it shall be the duty of said commissioners to so lay out and construct drains, either with or without a jury, or special commissioners, as provided for in sections five and six of this act.

Sec. 32. An act entitled "An act to provide for the drainage of swamps, marshes, and other low lands," approved March fifteenth, eighteen hundred and sixty-one, and all other acts or parts of acts, contravening the provisions of this act, are hereby repealed.

Sec. 33. This act shall take immediate effect.

Approved March 22, 1869.

A N A C T

To provide for the graduation of the price of Swamp Lands, and to authorize payment thereon in Swamp Land Scrip.

SECTION 1. *The People of the State of Michigan enact*, That the Commissioner of the State Land Office shall fix and graduate the price of swamp lands in the State of Michigan, not yet offered for sale at public auction, as follows: All State swamp lands not yet offered for sale at public auction, (except swamp lands in regard to which a conflict has arisen between the United States and the State of Michigan, commonly known as "Green Lands,") shall be offered for sale at the minimum price of eight dollars per acre, which shall be and remain the minimum price for the period of six months from, and embracing the day of public sale of such lands.

Sec. 2. At the expiration of the time provided in the first section of this act, the Commissioner of the State Land Office shall fix and establish the minimum price of all such swamp lands provided, for in said section one, remaining unsold, at six dollars per acre, which price so fixed shall be and remain the minimum for the period of six months, at the expiration of which time the said Commissioner shall fix and establish the minimum price of all such lands remaining unsold, at four dollars per acre, which minimum price so fixed shall be and remain the minimum price for the period of six months, at the expiration of which time the said Commissioner shall fix and establish the price of all such lands remaining unsold, at the minimum price of two dollars per acre.

Sec. 3. All swamp land scrip known as "general scrip" shall be received in payment of all lands sold under the provisions of this act: *Provided*, That no such scrip shall be received for more than its par value.

Sec. 4. This act shall take immediate effect.

Approved April 2, 1869.

AN ACT

To amend section sixteen hundred and eighty-seven of the Compiled Laws, requiring Boards of Supervisors to raise an annual tax for the benefit of Agricultural Societies.

SECTION 1. *The People of the State of Michigan enact, That* section sixteen hundred and eighty-seven, of the compiled laws, be and the same is hereby amended so as to read as follows:

(1687.) Sec. 1. In any county in this State, where the inhabitants thereof have organized and established, or may hereafter organize and establish a society for the encouragement and advancement of agriculture, manufactures, and the mechanic arts, and shall raise from said society annually, the sum of one hundred dollars or over, for the promotion of the above objects, in said county, which fact shall be certified by the president and secretary of the society, under oath, and a certificate thereof shall be filed with the clerk of the board of supervisors, the board of supervisors of said county, at their annual session in each and every year may, at their option, levy a tax of not less than one-fortieth nor more than one-tenth of one mill on the dollar, on the assessment roll of the county, which tax shall be collected and paid to the treasurer of the county in the same manner that other taxes are collected and paid: *Provided*, In any county where there are more than one agricultural society so reporting, the board shall apportion such amount between such societies as they may deem just: *Provided further*, That no horse-racing is had at the fairs held by either of such societies.

Approved April 3, 1869.

AN ACT

To Protect Vineyards in the State of Michigan.

SECTION 1. *The People of the State of Michigan enact, That* no person shall enter a vineyard in the State of Michigan, during the months of August, September and October, and eat or carry away any of the fruit of a vineyard, without the consent of the owner or occupant of the same, under a penalty of five dollars fine, or twenty days imprisonment in the county jail, or both, in the discretion of the court, for each offense committed.

Approved April 3, 1869.

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